CHRONIC DISEASES AND CULTURALLY COMPETENT COMMUNICATION

Bronwyn Scott

NSC 371
Polymathic Scholars Honors Program
Submitted to Fulfill the Plan II Honors Program Thesis Requirement
The University of Texas at Austin

Spring 2017

Alfred McAlister, PhD
Plan II Honors, School of Public Health
Supervising Professor

Stanley Reiser, MD, MPA, PhD
Plan II Honors, School of Public Health
Second Reader

ABSTRACT

Author: Bronwyn Scott

Title: Chronic Diseases and Culturally Competent Communication

Supervising Professors: Dr. Alfred McAlister, Dr. Stanley Reiser

Chronic diseases such as obesity and diabetes continue to account for an ever-increasing proportion – an estimated 73% by 2020 – of the global burden of disease, fueled by the epidemiologic transition. Despite their widespread prevalence and significant economic impact, no medical treatment has managed to significantly halt chronic disease progression. Socioeconomic and cultural needs often trump diet and exercise advice administered in medical settings. This is especially true for obesity, a disease that often precipitates multiple other co-morbidities such as cancer and diabetes. This thesis proposes to attack the growing obesity epidemic by changing the way health practitioners and public health workers interact with at-risk populations. Successful techniques and their efficacy were analyzed using peer-reviewed publications pulled from medical, public health, and technology-based sources. I argue that we can reduce the prevalence of chronic diseases by facilitating interdisciplinary communication between patients, health care professionals, and community health workers. Greater communication will allow patients to gain ownership over their health information and better evaluate the connection between their daily activities and health evaluations at the clinic. This interdisciplinary communication model will be based on pre-existing communication concepts currently taught in healthcare such as clinical empathy or patient-centered communication.

Key Words

Chronic Diseases, Cultural Competency, Interpersonal Health Communication, Narrative Medicine

CHRONIC DISEASES AND CULTURALLY COMPETENT COMMUNICATION

TABLE OF CONTENTS

I. INTRODUCTION 4

II. PROVIDER-PATIENT COMMUNICATION 6

A. INTERPERSONAL HEALTH COMMUNICATION STRATEGIES 8
B. TEACHING COMMUNICATION COMPETENCIES 14
C. SENSITIVE GROUPS AND CHRONIC DISEASES 22
D. CHALLENGES 24
E. RECOMMENDATIONS 24

III. EMPOWERING THE PATIENT 26

A. EMERGING TECHNOLOGY AND PATIENT INVOLVEMENT 26
B. "GAMEIFYING" HEALTH 31
C. PEER-TO-PEER MEDICINE 35
D. CHALLENGES 39
E. RECOMMENDATIONS 40

IV. COMMUNITY HEALTH WORKERS 42

A. RALLYING AROUND CHRONIC DISEASES 43
B. TECHNOLOGY AND COMMUNITY HEALTH 46
C. RUNNING SUCCESSFUL PROGRAMS 46
D. CHALLENGES 48
E. RECOMMENDATIONS 48

V. IMPLICATIONS 49

A. UNITED STATES POLICY 50
B. GLOBAL HEALTH ISSUES 53

VI. A THREE-PRONGED STRATEGY: COMMUNITY, PEOPLE, AND PROVIDERS 55

A. TECHNOLOGY 55
B. TRAINING 56
C. INCENTIVES 57

VII. CONCLUSION 57

ACKNOWLEDGEMENTS

I would like to thank my wonderful thesis advisors Dr. McAlister and Dr. Reiser who were consistent sources of positive encouragement throughout the writing process. I am also grateful for the multiple sources of inspiration for this project: Dr. Woodruff whose philosophy course led to my interest in medical ethics; Dr. Stanforth who introduced me to the intricacies of strategic health communication; and Dr. McCormick and Dr. Fisher-Hoch who spearheaded my first public health research project and inspired me to investigate population health programs. Finally, I would be remiss if I did not also send a heartfelt thank-you to my parents, Robin and Karl Scott, who patiently listened while I passionately extolled the importance of healthcare communication competencies and provided insightful comments. A big thank-you also to Rebecca Wilcox and the CNS Honors Center who supported me throughout the process.

I. INTRODUCTION

New technology both requires and begets new waves of thought. Chronic diseases are no exception – new ways of manufacturing food have spurred rising rates of obesity throughout the world, requiring new health communication methods to change attitudes towards nutrition and combat the rising pandemic. Unfortunately, although chronic diseases such as diabetes, cardiovascular disease, and cancer are estimated to account for 73% of global deaths by the year 2020 (Guilbert, 2003; Olson, 2016) and are the leading causes of deaths in the world, health systems have yet to implement successful measures to reduce the incidence of chronic disease (Yach, Hawkes, Gould, & Hofman, 2004).

Many medical historians blame this inadequacy on paternalistic attitudes perpetuated by doctors from the time of the Greeks to the late 20th century, claiming that the traditional clinical disregard for patient priorities provides patients little lasting motivation to change their personal habits (Lepping, Palmstierna, & Raveesh, 2016). Others cite the harmful influence of ever-encroaching technology on doctor-patient relationships (Sinsky et al., 2016). There is a need for medical and public health professionals to reconcile existing communication strategies with emerging technologies and develop ways to collaborate to reduce the global burden of chronic diseases. A three-pronged effort between patients, providers, and community health workers that incorporates individualized tracking technology may manage to shift health perceptions.

Health professionals, hearing this call to action, have already investigated new methodologies for interacting with patients. Public health officials aim to persuade the public to change their attitudes about activities ranging from eating healthy to smoking while respecting the cultural and socioeconomic backgrounds of their targets (Glanz, Rimer, & Viswanath, 2015). In recent years, these efforts have been characterized by a paradigm shift focusing attentions on

psychosocial and economic determinants of health in addition to medical or scientific problems (Scutchfield, 2004). This has been termed the "third public health revolution."

Back in the clinic, many medical professionals have investigated ways to shift their practice from paternalistic instructions to shared decision-making. They have found that doctors who practice clinical empathy (Garden, 2009; Riess, Kelley, Bailey, Konowitz, & Gray, 2011; Riess, Kelley, Bailey, Dunn, & Phillips, 2012), narrative medicine (Charon, 2001, 2004), and cultural competency (Beach et al., 2005), amongst others have better clinical outcomes and more trusting relationships with their patients. Newer models focused on patient-centered communication have incorporated technology into the patient experience, focusing on patient understanding and personalized data analysis (Finkelstein et al., 2012).

Community health worker programs, clinical systems, and patient-to-patient communication networks exist, however, as three separate actors with the same goals but different approaches. To date, their integration has not been effectively explored. Tied together, they present an opportunity to change the way the health systems operate and thus the way that populations manage and prevent chronic diseases. This paper will analyze all three sectors of health communication then propose various opportunities for strategic cooperation and policies that can be enacted to propagate better healthcare communication. Since treatment plans for many chronic diseases such as obesity and its common co-morbidity, diabetes, involve significant lifestyle changes that are best brought about via shared decision making (i.e., good communication), this analysis will hone in on communication efforts intended to ameliorate chronic diseases.

The section "Provider-Patient Communication" will provide an overview of efforts used to support doctor-patient communication. The field has focused on devising methods to instill

interrelated competencies in health professionals via integrated or continuing education programs with significant benefits to both patients and medical professionals. Section III will examine how democratization of healthcare data and social media are "Empowering the Patient." Section IV, "Community Health Workers," widens the scope to a larger, population-based public health perspective with an analysis of strategic health communication within three spheres: national campaigns, regional outreach, and health policy. Efforts with unique strategies and a focus on obesity and diabetes will be emphasized. Finally, Sections V "Implications" and VI "A Three-Pronged Strategy: Providers, Patients, and Community" will examine future steps for improving healthcare communication and describe a proposal for fostering interdisciplinary efforts.

II. PROVIDER-PATIENT COMMUNICATION

As the medical field transitions into what has been termed the third public health revolution[1], social determinants of health have become popular topics in medical discourse. The focus is no longer primarily on devising new technology and medications to treat illnesses – although that is certainly still a well-funded endeavor – but also devoted to finding ways to change population environments so that diseases can be prevented before they need to be treated. A patient's socioeconomic situation can have a significant impact not just on prevention but also on treatment. After all, if the patient cannot follow through with the doctor's orders, whether because of misunderstanding or realistic limitations like access to transportation, the probability of complications increases. A good doctor must be receptive to the cues that hide underneath a patient's acquiescence or recalcitrance and interpret them within the context of the patient's culture and socioeconomic status.

[1] Sanitary reform is considered the first public health revolution while the second involves health promotion pertaining to communicable diseases.

One way that physicians can gain the skills they need to be more sensitive to a patient's social determinants is to develop better communication skills and learn how to overcome their implicit biases. This spans from developing clinical empathy[2] to learning how to incorporate cultural and structural competencies into practices. These skills involve developing conversational and observational skills geared towards understanding and responding to a patient's emotional state. Teaching doctors how to make professional, empathetic connections with their patients benefits the doctors as well as the patients. Research indicates that providing high quality care with such meaningful reactions reduces physician burn-out and increases quality of life and perceived career satisfaction (Friedberg et al., 2013).

Unfortunately, the focus on technology and overall culture of medical education often dissuades medical students from attaining such communication skills. Many studies have proven that empathy, measured using various survey methods, significantly declines during the clinical years of medical school. Medical schools have attempted to rectify this problem by including various humanities and art-related programs in their curriculum. Other interventions have tried to incentivize communications training by offering current medical professionals continuing medical education (CME) credits for completing empathy training. While beneficial, these interventions are scattered and unstandardized. Moreover, there are no hard requirements ensuring that physicians develop communication competencies; the existing national board exam evaluating doctor-patient interaction focuses more on procedures than the interaction itself[3].

[2] Clinical empathy is best understood as a tool that medical professionals may use to better understand the patient's perspective and thus better take histories, explain diagnoses, and personally deal with stress.

[3] It is running joke amongst medical students that you need three months of studying for the exam testing scientific knowledge, one month of study for the exam testing clinical knowledge, and a number two pencil for the test that evaluates interpersonal skills.

A. INTERPERSONAL HEALTH COMMUNICATION STRATEGIES

Clinical Empathy

Despite its uniformly positive reputation, empathy remains an amorphous concept that defies definition. This is especially true in the clinical environment, where many researchers have taken the liberty of redefining the term to suit their needs. Clinical empathy has undergone multiple transformations over the years as the term shifts to suit the predominating understanding of the doctor-patient relationship.

Clinical empathy began in the early 1950s and 1960s as a type of detached reasoning entirely devoid of sympathy (Blumgart, 1964). Sympathy, for the purposes of this analysis, will be considered the experience of sharing another person's emotional feeling as opposed to merely intellectually understanding it. That is, sympathy is an emotional state of mind while empathy is a more intellectual attribute (Neumann et al., 2009). The doctor-patient interaction in this case involved a very clinical, detached "empathetic" listening style that emphasized the importance of refraining from emotional involvement. Although it is important for physicians to maintain a professional distance from the people they serve, both for their own emotional health and to avoid errors, this type of empathy does not add to doctor-patient communication. A good communication exchange involves more than detached listening; there must be a response that has in some way absorbed the other's state of mind.

More recent definitions of empathy take this criticism into account and advocate greater emotional attunement. This emotional resonance stems from attending nonverbal cues that allow doctors cognitive insight into the fears and concerns of patients so that they can parse out connotative meanings during patients' consultations (Halpern, 2003). The idea is that doctors who allow themselves to feel emotions (e.g., reflecting a patient's anxiety about a procedure with a show of concern) elicit more trust from patients because they can sense emotional undertones

(Garden, 2009; Riess et al., 2011; Riess et al., 2012). Emotionally-connected doctors know when to dive into technical explanations and when to allow moments of silence.

This "action" component begins with a *cognitive* component, analyzing what the patient's thoughts about their procedure or condition could be and setting them within the context of cultural understanding. This leads to *understanding* the patient's reaction, both verbal and nonverbal. The doctor then must *communicate* this understanding back to the patient with an explicit *intention to help*. Some researchers even emphasize that the doctor must first be emotionally capable of imagining another person's emotional perspective and feel an internal moral imperative to empathize with their patients (Stepien & Baernstein, 2006). Proper use of silence, explanation, and body language rather than detachment has become a major component of modern clinical empathy. In fact, clinical empathy can be thought of as a process rather than an independent act: cognitive, understanding, communication, and intention to help (the "action components") (Garden, 2009; Hojat et al., 2009).

Thus, for my purpose, clinical empathy will be defined in accordance with the accepted definition propagated by Mercer and Reynolds. Clinical empathy is a physician's ability to:

> (a) Understand the patient's situation, perspective and feelings (and their attached meanings), (b) communicate that understanding and check its accuracy and (c) act on that understanding with the patient in a helpful (therapeutic) way. (Mercer & Reynolds, 2002)

It makes intuitive sense that empathetic communication can have beneficial impacts on both the patient outcomes and doctor morale. Furthermore, studies have indicated that an empathetic approach can have statistically significant beneficial effects on medical situations where doctors have to break bad news (Girgis & Sanson-Fisher, 1995) and helps reduce cancer patient anxiety

(Butow, Maclean, Dunn, Tattersall, & Boyer, 1997). Although it is tempting to see these studies as proof of the intuitive concept, it is important to note that "empathy's" amorphous meaning translates to differential testing. The study on breaking bad news involved a qualitative consensus survey of medical professionals and patients, asking questions related to preference. Cancer patient anxiety and its relationship to the doctor's communication style were assessed via a survey given to patients before and immediately after a consultation. In both studies, however, empathy was loosely taken to be a show of emotional support (the "action" component of the clinical empathy defined above). Thus, although study designs differ, the results can be taken as indicators of empathy's positive impact on doctor-patient discussions concerning difficult subjects.

Furthermore, clinical empathy strategies allow doctors to better obtain the information they need for proper diagnoses and treatment plans. As has been noted in the previous section, patients are more likely to trust doctors that emote. Doctors are also more likely to pick up on cues indicating uncertainty or misunderstanding and subsequently rectify the situation (Finset, 2012). In addition, empathy enables doctors to better conduct psychosocial investigations (Levinson & Roter, 1995). These include inquiries into the patient's social support, sources of possible psychological stressors, or environmental hazards: situations of which the doctor would not otherwise be aware.

Narrative Medicine

Narrative medicine emphasizes the importance of recognizing, absorbing, and interpreting stories of illness. This communication style focuses on improving the effectiveness of care by developing observational skills and encouraging collaboration between health care professional and patient. Practitioners are taught to shift the traditional balance of power from

the doctor to the patient, facilitating patient involvement by emphasizing the importance of their stories and subsequently growing self-efficacy[4]. Dr. Rita Charon, the leader of the field, and her colleagues have demonstrated that patients who are given the chance to tell their stories are more likely to present crucial information and that doctors who take the time to listen deliver more effective, personalized care (Charon, 2001, 2004).

This type of intervention is particularly effective for medical problems better treated by persuasion than medication. Narrative training has demonstrated significant health behavior changes when combined with diabetes and food counseling, especially when doctors are taught cultural competency skills (Habash, 2015; Kohn; Perkin & Rodriguez). These successes indicate that hospitals and insurance companies operating on a value-care model would benefit from offering health practitioners narrative training. After all, a typical patient suffering from obesity would benefit more from a personal health narrative change than a medication.

As with most of the communication interventions, narrative medicine faces accusations that the time necessary to administer the training detracts from the real business of hospitals and that the benefits are too anecdotal to merit wide-spread dissemination. The paradigm still holds that scientific understanding trumps storytelling. There does not seem to be any space in undergraduate medical education, not to mention graduate training, to elevate narrative medicine from interesting elective to necessary training. A paradigm shift would require the concerted efforts of medical leadership in the form of both people and institutional guidelines. The impetus for this transition may come from further studies proving the benefit of narratives to both medical students, veteran providers, and patients or it may stem from protestations on both sides against shortened medical visit times.

[4] Self-efficacy refers to one's confidence that one can succeed or accomplish a task. In this scenario, self-efficacy would refer to the patient's belief that they can improve their health by successfully following their doctor's recommendations.

Cultural Competency

Cultural competency indicates the ability to demonstrate awareness, attitude, knowledge, and skills allowing one to work cross-culturally. Much attention has been paid to cultural competency in recent years in the United States as research revealed that the nation's diverse populations received significantly different qualities of care (Beach et al., 2005). Cultural tendencies to describe illnesses with narratives foreign to doctors, using different terminology or different languages than doctors were trained in, resulted in substandard care. For example, African Americans are more likely to be over diagnosed with schizophrenia and underdiagnosed with depression than non-Hispanic whites (Snowden, 2003). The great interest of health care providers and patients in this issue resulted in its inclusion in the Affordable Care Act ("Patient Protection and Affordable Care Act," 2010). Amongst all the medical communication competencies, cultural competency is the most well-known.

Although health professional training has demonstrated increases in these competencies, more evidence is needed to determine if it subsequently affects patient adherence, health outcomes, or equity (Beach et al., 2005). It is difficult to draw conclusions from short-term studies that do not control for the varied interactions patients have with healthcare teams. Regardless, cultural competency is still a serious topic in healthcare and policy discussions. Medical educators, politicians, and hospitals have created programs to encourage minorities to train as healthcare professionals. Senator Eddie Lucio, representing the lower Rio Grande Valley, even passed a law facilitating the accreditation of nurses traveling from Mexico to work on the Texas border (SB 572). His goal was to increase the number of culturally competent healthcare providers to better meet the needs of a population derived largely from Mexican immigrants.

Cultural competency has been linked to clinical empathy. They are slightly different concepts with similar goals. A systematic review of cultural competency interventions indicated that research studies with positive results focused on techniques similar to those ascribed to increasing clinical empathy, including communication skills and a pateint-centered approach (Beach et al., 2005). These similarities suggest that cultural competency training and clinical empathy interventions could easily be integrated. As with the empathy interventions, however, these studies all employed disparate techniques and evaluations, making it difficult to pinpoint which approaches result in the best outcomes.

Structural Competency

Structural competency, while very similar to cultural competency and clinical empathy, differs by its focus on environmental factors rather than cultural constructs. Training in structural competency is intended to improve population-level knowledge of social and economic forces and how they shape both medical inequalities and epigenetics (Metzl & Hansen, 2014). This is the type of education that seems primed for integration with the study of disease. For example, a study of Chagas' Disease (Sleeping Sickness) – or, for that matter, the mosquito-borne Zika virus – can also serve as a platform to discuss how differential living situations modulate risk. Ideally, such population-level perspectives would stick with medical professionals throughout their future practice. Some medical schools such as the Duke University School of Medicine (Kaprielian et al., 2013) are already including these historical perspectives with pertinent units. Other medical schools have received funding from the Association for American Medical Colleges and the Centers for Disease Control and Prevention as part of their "Regional Medicine-Public Health Education Center program; the program requires institutions to partner

with public health agencies and incorporate a public health perspective into their curriculum ("RMPHEC Grantees," 2017).

Structural competency, like cultural competency, narrative medicine, and clinical empathy, is just a fancy term for learning how to expand medical concern from the body to larger societal and personal factors that impact people. Researchers tend to focus on one competency, using trials to demonstrate their benefits, rather than exploring unifying themes that could be incorporated across practices. For example, both cultural competency and narrative medicine highlight the importance of collaborating in a shared-decision model setting. Since all these competencies have proven beneficial and require similar training methodologies, it is strange that these ideas remain disparate. A training program that integrates various communication competencies merits further research.

B. TEACHING COMMUNICATION COMPETENCIES

Medical school traditionally does a poor job of teaching doctors and other health professionals how to communicate with their patients. The competencies described earlier stemmed from a desire to rectify the medical profession's tendency to decrease employee's empathetic tendencies. It is unlikely, however, that any lasting change in this trend can occur without first examining its source – education – and evaluating ways it can be restructured. This is a particularly good time to do so as many medical schools are currently re-designing their curriculum to meet new standards and regulations which do include cultural competencies.

The Clinic Kills It

Various methods have been designed to test empathy, usually employing a survey before and after an intervention. One of these, the Jefferson Scale of Empathy, specifically provides a scaled empathy score for physicians, residents, and medical students. This test was designed to

incorporate both cognitive and emotional reactions related to empathetic responses (Davis, 1980). A key study using the Jefferson Scale of Empathy on medical students at the Jefferson Medical College found that medical students generally enter medical school with high empathy scores, but they experience a significant decline in empathy upon entrance into the clinical rotation portion of medical education (Hojat et al., 2009).[5] The results of this study shocked many medical institutions and inspired curriculum changes.

A more recent systematic review of the literature related to this empathy decline revealed, however, that it is still a widespread problem. In addition, decreases in empathy were accompanied by similar decreases in moral judgment competence and commitment to underserved populations (Neumann et al., 2011). Again, the speculated reasons for the downturn focused on medical care culture and demands: poor stress management, fragmented clinical relationship due to little continuity of care, high workload and responsibility without a social support system, and mistreatment by superiors who offer poor mentorship. In particular, researchers have identified anxiety and feeling pressured for time as key factors (Halpern, 2003). These negative factors generate a feedback loop as medical trainees graduate and begin teaching younger generations habits that lead to disregard of the need for psychosocial discussions (Levinson & Roter, 1995).

Medical training institutions have taken the initiative to break this loop by instituting programs training young professionals in ethical medical communications. Some of the resulting programs will be analyzed in the following sections. Although the problem stems from the medical system itself as much as doctor training, training intervention offer a mechanism to

[5] Interestingly, this decline was steeper for students pursuing technology-oriented specialties such as radiology, and male students had lower empathy scores than women both before and after clinical training. This indicates that individuals likely have proclivities for empathy before they begin their training. Like with any other skill, however, the presence of natural inclinations does not negate the need for training.

initiate a change in the medical profession's culture. The one positive indication shown by the sharp decline in empathy, after all, is that the professionals tend to start out with high empathy scores, and it is easier to maintain a trend than to induce one.

Teaching Doctors How to Talk

Combining sensitive understandings of patients with physiological analysis is not a new concept. As early as 1780, Clemente Susini crafted a wax model called the *Venere dei Medici* with both anatomical accuracy and artistic flare depicting the human element (Mazzotti et al., 2010). The female model's thorax and abdomen contain wax organs (including a fetus!) that can be lifted out to simulate a dissection in a neat scientific manner. This is purposefully juxtaposed against her jewelry, attractive face, and sensual pose. In many ways, inclusion of often art-related subjects such as medical humanities to cultivate empathy or cultural competency attempts to create a similar *Venerina*, a conglomeration of technical instruction and artistic renderings of humanity.

Fig. 1 Museo di Palazzo Poggi – *La "Venerina" di ClementeSusini*

For humanity to be integrated into medical training, however, it must first be sufficiently organized into teachable curriculum. Many studies have indicated that empathetic communication can be learned and, once learned, has a significant beneficial impact on patient outcomes related to doctor-patient consultations. It has been shown that educational methods such as the study of literature or narrative techniques and reflective writing exercises can make physicians more aware of the patient's experience of illness (Garden, 2009). Furthermore, attending physicians can be taught to respond instructively to learner (i.e., residents or other trainees) behavior indicating a lack of empathy towards patients (Burack, Irby, Carline, Root, & Larson, 1999). This has important implications for the apparent lack of and need for empathetic instruction during the clinical years.

Attitude-aimed interventions, in addition to communication skills, may also prove of use. Concerned that poor physician attitudes towards psychosocial aspects of patient care could negatively impact effective communication, one study created a statistical model evaluating the correlation between the two (Levinson & Roter, 1995). Quantification of good communication was achieved by determining the frequency of open-ended questions, biomedical information, preventative information, emotional talk, and social talk within both doctor and patient discourse. It was found that doctors with positive attitudes towards psychosocial issues can have more patient-centered conversations wherein the patients offer up more information. This indicates that empathetic communication styles may be achieved by emphasizing the importance of health's social determinants.

Alternatively, medical professionals can be taught to change their attitudes and believes pertaining to communication competencies. For example, Larson suggests reframing clinical empathy as "emotional labor," a concept first employed to describe the control service-oriented

organizations have over their worker's emotional presentation to customers (Larson & Yao, 2005). This type of organizational control can be achieved by training healthcare workers in methods of acting wherein they are taught how to present positive and open attitudes that facilitate communication with their patients. By making communication and outward attitudes a part of the clinical job – a type of labor – patient-centered communication may become more important to the subset of the medical community that deems communication outside the scope of their responsibility.

The aforementioned studies indicate that it is possible to teach medical professionals patient-centered communication (clinical empathy), good mentorship skills that reinforce this behavior, and the attitudes correlated with the desired medical conversation style. As yet, however, there are no standardized curricula to teach medical students the importance of and how to practice with clinical empathy, psychosocial discussions, or cultural competency. Training is primarily restricted to small group sessions led by trusted faculty who teach competencies based on their own experience rather than research-proven methodologies.[6]

Empathy Interventions

Most medical schools offer courses intended to humanize medical education. These are usually optional, and studies evaluating their efficacy tend to have low statistical power due to small sample sizes. Examples of interventions include theater programs, medical humanities courses, experiential learning, and narrative explorations. These interventions are considered effective if study participants have higher post-test empathy scores – measured using a variety of tests – than initial scores and differ significantly from a control group.

[6] This analysis is based on information I gleaned while interviewing at 15 medical institutions around the country. No peer-reviewed publication has yet dug into the pertinent curricula.

The various strategies that found positive – if not strong – correlations between educated groups and increased clinical empathy can be organized into four categories: communication skills, narrative exercises, experiential learning, and self-care. A systematic literature review revealed that all of these strategies generally increase understanding of the patient perspective even if it may be a stretch to say they increase empathy (Stepien & Baernstein, 2006). These strategies are explored below.

Communication Skills

Teaching communication skills involves training via lectures, workshops, or videos. For example, the communication training employed by Bonvicini taught physicians to acknowledge patient emotional or psychosocial concerns, then follow up with a question coaxing the patient to find a resolution to their problem or concern (Bonvicini et al., 2009). The researchers then conducted an observational study, listening to recordings of patient interviews before and after the intervention. As expected, they found that trained physicians had higher empathetic ratings.

These educational supplements often draw teachings from outside disciplines. For example, theater professors taught a small pilot theater program conducted at the Virginia Commonwealth University (Dow, Leong, Anderson, Wenzel, & Team, 2007). The curriculum focused on communication skills often employed by thespians: physical expressiveness, body language, and vocal presence. This short theater course coincided with a clinical rotation, integrating the course into medical education. It is difficult, however, to draw conclusions from such a small sample size (20 students).

Narrative Exercises

Narratives are often explored via artistic mediums like theater performances, literature, and writing. These exercises tend to be more effective at increasing cognitive understanding of

complex emotions but do not always increase empathy scores (Stepien & Baernstein, 2006). For example, a small narrative study asked residents to write about a personal medical experience they had as a result of a personal illness or the illness of a close family member and found that the medical professionals subsequently reported better understanding of the patient experience (DasGupta & Charon, 2004). Creating a narrative from patient experiences via reflective writing has further been touted as a way for physicians to better understand first-person accounts of illness and thus maintain their curiosity about ancillary health effectors such as home environment and workplace dangers, among others (Charon, 2001). Certainly, gaining experience with both generating and analyzing narratives enables doctors to take better patient histories and shift away from predominantly focusing on technological outputs.

Paying Attention

Art has been used in various media to teach practitioners how to pay attention to small details and break complex problems into digestible pieces. Practices such as close visual art analysis encourages comfort with the uncertain (Kidd et al., 2016). This is especially important for medical practitioners as they are often confronted with morally ambiguous situations – religious conflicts with care, adolescent medical autonomy, determining decision-making capacity, etc. – that are all too easy to shy away from into the relative comfort of diagnosis and testing. Students self-report that medical humanities curriculum such as art analysis or narrative exercises enhances their professional development and makes them better equipped to have difficult conversations (Miller, Balmer, Hermann, Graham, & Charon, 2014).

Experiential Learning

Some training programs go so far as to thrust medical trainees into the role of the patient. For example, one program required that students enroll as patients in an unsuspecting hospital

while pretending to have certain assigned symptoms (Wilkes, Milgrom, & Hoffman, 2002). This gave students a first-hand experience with the impact poor physician attitudes can have on quality of care and provide incentive for developing clinical empathy skills. Another example, the Patient Navigator Project, tasks students with shadowing patients as they navigate the hospital environment and their diagnosis (Henry-Tillman, Deloney, Savidge, Graham, & Klimberg, 2002). Upon reflection, most students indicated that the experience helped them humanize the patients.

Self-Care

Doctors can increase their empathetic responses to others by simply taking care of their personal emotional states; merely taking courses on wellness-related activities increases empathetic responses to the typical surveys (DiLalla, Hull, Dorsey, Department of, & Community Medicine, 2004; Kinsella & Bidinosti, 2016). This can be accomplished via various spiritual or wellness-related techniques such as mindfulness meditation or physical exercise.

Neuroscience and Empathy

Although clinical empathy has been loosely correlated to patient outcomes and satisfaction, there still exists a need to study the scientific bases for empathy. It is possible that developing an understanding of the neurobiological signals that accompany emotive signals would help doctors better understand which tactics can be generally employed and how individual communication preferences can be taken account during patient consultations (Finset, 2012). It is also of use to study the science behind empathetic communication because medical professionals and the people who pay them often respond more strongly to advice grounded in empirical evidence.

Some headway has already been made in this area. A large study evaluating the efficacy of three 60-minute post-graduate training modules, based on of a curriculum tested in a pilot study with otolaryngology residents (Riess et al., 2011), found that they significantly increased empathetic responses[7] (Riess et al., 2012). Other studies have evaluated the response of mirror neurons to variously defined "empathetic interactions" with partners (Neumann et al., 2009). This suggests that there is a neurological basis for empathy, and that it may be found in the mirror neurons.

C. SENSITIVE GROUPS AND CHRONIC DISEASES

Most of the aforementioned strategies for increasing empathy can easily be integrated into medical education, especially if they are associated with and can be taught alongside scientific neuroscience topics. It is not clear, however, if these general communication-based interventions provide medical students with the skills they need to interact with sensitive patient populations such as the LGBTQ community or patients that identify with minority cultures.

A recent study of around 100 medical school curricula spend an average of 5 hours total discussing topics relating to the LGBTQ community (Obedin-Maliver et al., 2011). These instructions include subjects related to the community's increased risk of chronic disease, mental health issues, sexually transmitted infections, and HIV as well as communication skills training. Proper communication is especially important in establishing a trusting doctor-patient relationship. For example, as it is less likely for trans patients to disclose their medical information when they are not being addressed by the gender they identify with. Ideally, empathy training could encompass these issues and present methods that ease both patient and doctor anxiety. Some medical campuses are dealing with this issue innovative ways. For example, the medical students at McGill University created a collective theater piece exploring

[7] Empathy was evaluated via various empathy survey tests.

ideas relating to sex and sexuality to better contextualize the information they learned in their classrooms ("S(t)imulation—a play created by McGill medical students— encourages empathy and an open dialogue about sex, people and the power of ideas," 2016).

Training to increase empathy has already been employed to propagate cultural competency for sensitive groups. For example, a study with community health nurses used an experiential learning technique to help students develop greater empathy for impoverished patients (Yang, Woomer, Agbemenu, & Williams, 2014). The students subsequently demonstrated better understanding of impoverished people's needs and desire to initiate inter-professional collaborations to meet those needs. This is an especially interesting development given the stereotypical attitude amongst doctors that physicians should not have to contend with messy money issues.

Empathetic communication patterns have also been associated with better outcomes for chronic diseases. For example, a study that ranked physician empathy at a particular hospital using the Jefferson Scale of Empathy found that higher empathy scores correlated with better clinical outcomes for diabetic patients (Hojat et al., 2011). Patients of physicians with high empathy scores were more likely to have good control of their A1c (hemoglobin) levels ($p<0.001$). This positive correlation indicates that empathy – or other indicators of communication skills – should be a core medial competency. Hojat et al. did not assess the relationship between specific skills and medical outcomes, but they surmised that they related to physician's ability to facilitate understanding and trust with their patients which subsequently led to patients sharing medical information and adhering to treatment plans. This would agree with what we know about the effect of good communicaiton on medical relationships.

It is important that whatever intervention is chosen focus on the patient's suffering and achieving an understanding of the patient's sociocultural situation. This can be accomplished by (1) remembering to treat the patient as an authority on their illness and thus seriously taking patient histories, (2) taking action to relieve patient suffering whether physiological or psychosocial, and (3) extending the sphere of concern to the patient's social context (Garden, 2009). These tactics can be broadly applied to many situations. Broad application and general statements can, however, present difficulties in training as they are difficult to standardize. The best method may be to encourage medical educators to incorporate communication case studies into discussions of pertinent diseases.

D. CHALLENGES

It is surprising that there are no standard approaches to communications training either as a part of medical school or continued medical education given the proven benefits of empathy and communication training that tends to result in increases in clinical empathy. Instead, most communications training is based on the whims of the educational institution or tied to an apprentice-type relationship with physicians that dissipates with time. There is no insurance that communication competencies will be taught or emphasized in medical training. This is made more difficult by claims that there is not enough time in the training schedule to include communications training. Moreover, medical trainees have a difficult time taking instruction based in the soft sciences seriously in the face of extreme pressure to quickly assimilate a large quantity of technical knowledge (Elliot M. Hirsch, 2007).

E. RECOMMENDATIONS

Despite these difficulties, there are logistical arguments for communications training that address these issues. Clinical communications skills may require time and money to develop, but time and money are already being devoted to other practices that lack substantial evidence

indicating their efficacy. For example, studies suggest that the incorporation of substandard electronic health record (EHR) trainings has taken time from physician-patient interactions and contributed to physician burnout (Sinsky et al., 2016). Such negative interpersonal impacts may be mitigated by including communications trainings in conjunction with the introduction of new technology. Since the technology requirements were established at the federal level with the Affordable Care Act, incorporating such communications training may require campaigning at the federal level. Given the current uncertainty regarding the United States healthcare system, now may be the perfect time to lobby for new training requirements.

Speaking of training requirements, there are many ways competent communication can be integrated into current healthcare curriculums and practices. Many medical schools are already including more clinical time in their curricula and reducing the focus on basic sciences. This provides more opportunities to sneak communication into the curriculum. A clinical empathy curriculum could include research-substantiated interventions such as role-playing, acting as a patient navigator, improving narrative skills, writing/watching/performing theatrical performances, practicing mindfulness, reflecting on medical experiences within a small group, or participating in communication skill workshops (Hojat et al., 2009; Neumann et al., 2011). Rising physicians could also be required to spend some time in a community care center where it is often easier to follow individual patients' journeys.

One way to ensure that these communication competencies are taught during undergraduate or continuing healthcare worker education would be to include communication competencies on national board exams (Henry, Holmboe, & Frankel, 2013). Henry et al. point out in their paper that doing so may require a streamlined approach that treats proper communication as a procedure like other technical medical competencies. Although this seems

too reductive for the difficult and nuanced conversations healthcare professionals must prepare themselves for, providing a stepwise procedure would aid with the overall standardization so that programs are no longer tied to interested parties rather than ingrained in institutions.

III. EMPOWERING THE PATIENT

The popular movement in modern medicine towards *patient-centered communication* represents a dramatic shift away from the paternalistic medical culture of the past. Patient-centered communication refers to medical practice that validates the patient's perspective, psychosocial background, and shared decision-making capabilities (Epstein RM, 2007; Epstein & Street, 2011). Greater cultural understanding and hospital policies make it more likely that healthcare providers will incorporate these perspectives. Moreover, these attitudes are becoming more ingrained in the medical culture. Many medical schools are even transitioning to interview processes that are intended to assess candidates' abilities to traverse complicated ethical situations that involve cultural sensitivities.

Although it is often implicated in the breakdown of patient-provider communications, technology has the potential to empower patient control of their own health information. This allows patients to play a greater role in the interaction thanks to greater understanding of the overall medical complication and how their lifestyle trends influence health outcomes. Furthermore, democratization of health data via the sharing of health information and use of medical sensors will make medical paternalism obsolete as doctors are no longer required to stand between patients and their information to interpret data.

A. EMERGING TECHNOLOGY AND PATIENT INVOLVEMENT

Emerging technology represents opportunities to involve patients with their own health. Technology has the potential to increase patient self-efficacy by improving their understanding

of and engagement with oft-complicated health metrics. Successful patient engagement has been demonstrated via both implementing new technologies and training providers to better use existing ones. Moreover, new technologies have implications for long-term health data tracking which is useful for chronic diseases that often necessitate lifestyle changes that lack immediate returns and are difficult to maintain.

Implementing New Technologies

Successful implementation of technological patient-centered communication include secure messaging, eVisits, and multiple provider communication (handoffs) training (Finney Rutten et al., 2014). In each of these instances, providers are encouraged to value the patient's input and consciously strive to provide patients with ample opportunities to communicate their concerns. Providers are often unable to address all patient concerns during the allotted fifteen-minute appointment time, so electronic communication provides a secure location for unanswered questions. This prevents potentially harmful misunderstandings and allows physicians to gain a more holistic understanding of their patient's situation outside the hospital.

Researchers have also experimented with creating a web-based health interface to provide accessible, relevant, and quality information to the public Asan, Young, Chewning, & Montague, 2015). This type of information system is intended to counteract the misleading or often incorrect information available on the web. This allows patients to ask questions of a credible source in a safe, non-judgmental environment that they were either too embarrassed to ask in the doctor's office or ignorant of at the time of their provider visit. Furthermore, the interface supports patient interaction with health problems in their home environments. Such continued attention is valuable when trying to change habits such as eating or exercise that have spatial associations with home activities.

Provider Training

Even if healthcare workplaces do not have the resources to implement completely new technologies, providers can still be trained in active information sharing. This can be as simple as showing providers how to encourage patient engagement when both patient and provider are looking at a computer monitor (Asan, Young, Chewning, & Montague, 2015). In this way, technology can be used as a tool that assimilates and simplifies complex data or ideas rather than a wall between provider and patient. This is where the communications trainings – cultural competency, structural competency, clinical empathy, etc. – discussed in the previous section comes into play. Providers equipped with communications training are more aware of the nuances inherent in patient situations and capable of incorporating that awareness in interpersonal interactions.

Patients given access to their own medical information via more open providers are more likely to engage with their health. This engagement begins at the doctor's office where, given a visual and encouraged by simple acts like screen sharing, patients are more likely to formulate questions and feel like their concerns matter. This helps patients better prepare to integrate health recommendations into their life at home. On the other hand, inclusion of new technologies without provider training is more likely to have no or negative effect on patient engagement. After all, even though it is their own medical history, patients are unlikely to get up and snoop behind a doctor's back as they enter data into computers and analyze health metrics. The onus rests on the provider to initiate the sharing process.

Social media and other communications platforms can be instrumental in facilitating open relationships between doctors and patients. For example, a Twitter chat that connected an artist with lung cancer with a pathologist facilitated a personal connection between the two that

enriched both of their experiences (Olson, 2016). Exposure to patient experiences helped the pathologist contextualize his work and conceptualize a role for pathology in using precision medicine for prevention of disease. After visiting the pathology lab, the artist was inspired with new material for her work which helped her process her illness and may inspire other patients on their road to accepting their illnesses. This anecdotal case provides an example of how patient-initiated communication can be beneficial for both medical professionals and the communities they serve.

Chronic Diseases

Patient-centered technologies are especially beneficial for patients with chronic diseases that necessitate lifestyle changes. Patients with access to portable devices such as smartphones can use technology to communicate with providers while at home or track their lifestyle choices. Increased communication allows patients to feel like they are working with their healthcare team towards a sustainable solution. That is, positive patient-centered correlates with higher levels of self-efficacy (Finney Rutten et al., 2016). Increased tracking also emphasizes the connection between health decisions and health metrics. This is very important for patients with diseases such as diabetes or obesity that, while they can be treated with medication, are best reversed via diet and exercise.

For example, researchers suggest adopting the existing Chronic Care Model (CCM) into an electronic Chronic Care Model (eCCM). The original CCM includes (1) community resources, (2) health system support, (3) self-management support, (4) delivery system design, (5) decision support, and (6) clinical information system; the eCCM would add online social networks and health systems access (Gee, Greenwood, Paterniti, Ward, & Miller, 2015). These

social networks provide patients the opportunity to interact with people they can relate to and provide real-time encouragement.

Other models provide patients with tools that can monitor various metrics such as weight, glucose levels, and heart rate. This is a rich source of data for hospitals and providers. More importantly, the ability to measure their own body metrics empowers patients, increases autonomy, and improves cost-effectiveness (Wildevuur & Simonse, 2015). The ability to monitor themselves gives patients a stake in their own health. They can no longer subsist as passive actors content with medication rather than habit modification. Analyzing trends may also help patients strive for long-term goals.

One example of such wearable technology is the mHealth Screening to Prevent Strokes (mSToPS) trial. In this trial, researchers teamed up with Aetna, an insurance company, to determine if providing home monitoring (intermittent ECG recordings) to a risk-targeted screening population could reduce the prevalence of undiagnosed atrial fibrillation (Steinhubl et al., 2016). The study has not yet reported results. Another example, Walgreen's "Balance Rewards for Healthy Choices" program, however, has reached the analysis phase (J. Y. Kim et al., 2016). This program provided incentivized, web-based activities that users could complete such as quitting smoking and eating healthy. In return, users received discounts they could use in the store. The study found that about 30% of users quit after the first week and about 30% of users were still using the application at 20 weeks into the analysis. Interestingly, none of the participants joined at the behest of their physician and most (about 80%) were women. The study did, however, demonstrate that preventative programs utilizing outside incentives could be successful in changing health behaviors.

Although the example presented above focused on the utility improvement for providers and insurance companies, wearable devices could easily be integrated into something like the eCCM. Doctors and patients could use the constant data stream and work as partners to prevent chronic diseases by catching early indicators of disease. This type of tactic, however, can only emerge if providers manage to avoid paternalistic tendencies (e.g., patients are given monitors but no stake in keeping their metrics stable). Insurance companies such as Aetna could play an important role in facilitating this exchange as both they and the patient could operate on similar monetary incentives. Insurance companies do not want their people to get sick, so they could provide incentives for monitoring and maintaining certain health statistics.

However, if doctors and insurance companies want patients to engage with their health outside of medial visits and medical devices, they must be aware of and counsel their patients to participate in public health initiatives like the Walgreens "Balance Rewards for Healthy Choices" program. This represents a need for health professionals to facilitate better, technical communication with both their patients and their patients' communities.

B. "GAMEIFYING" HEALTH

In medicine, one-on-one discussions are often not the best way to help patients internalize information. This has prompted some doctors and public health professionals to think outside the box. After all, communication encompasses interactions that supersede traditional conversations. One such subsection of interactions that has become popular in the medical world is gaming or role-playing. "Gamification" refers to the application of typical game-playing elements to other activities as a technique to increase engagement. In the healthcare world, this is typically used to help people understand complex medical topics or increase conversations concerning

preventative care. This type of application to serious topics intended to teach gamers positive learning outcomes is called the "Serious Games" movement.

Game Changer Chicago Design Lab

The Game Changer Chicago Design Lab at the University of Chicago is a partnership between game designers and researchers led by an Ob/Gyn interested in sexual and reproductive health. The lab has successfully created a game-based sexual education curriculum for eighth-graders in the lower south side of Chicago as well as at the University of Ibadan in Nigeria (Gilliam et al., 2016; Gilliam et al., 2012). This curriculum employed digital storytelling, media, and game design to help promote frank discussions about topics ranging from safe sex to sexually transmitted diseases. These programs are designed with an "embedded learning" approach that utilizes intermixing (on-topic and off-topic conversations), obfuscation (directing attention away from true aims), and strategic inversion (irony or satire). Such embedded learning is theoretically more enjoyable and likely to stick than the traditional interactive quizzes associated with educational games.

The lab has developed many other health-related games. These include: "Smokestack" which is designed to help youths understand the callous nature of tobacco companies, "Bystander" which is intended to confront sexual violence issues, and "The Test" which was designed to increase STD testing amongst men who have sex with men. These games seek to subtly change attitudes about health behaviors.

Although these are niche games for research projects, similar techniques on a smaller scale could be incorporated into medical practices. Instead of spending time flipping through magazines and learning about celebrities' newest clothes in the waiting room, patients could play personalized games to help better prepare them for conversations with their doctors. Doctors

could also proscribe games that help patients quit smoking or report sexual assault via role playing. This could even be something insurance companies want to buy into, perhaps as a premium deduction, if game designers create a game proven to help prevent costly chronic diseases like obesity and diabetes.

Prescribing X-box Time

Perhaps unique to leisure-time physical activity, virtual reality video games show potential for converting traditionally sedentary activities to healthy habits. This is especially true for the game called "Dance Dance Revolution" (DDR). This game has been favorably reviewed as an easy and fun method for improving balance, cerebrovascular health, and overall aerobic fitness by groups ranging from obese children to adults with Parkinson's Disease (Murphy et al., 2009; Natbony, Zimmer, Ivanco, Studenski, & Jain, 2013). Although they may not serve as perfect substitutions for normal aerobic activities, "exergames" (a term created by the combination of "exercise" and "game") may serve as beneficial additions to exercise programs that aim to help participants develop self-efficacy. People that manage to increase their skill level in video games may be more willing to think of themselves as competent dancers or exercisers. Video games also easily incorporate social interactions and may help decrease attrition.

Leveling Up Chronic Disease Care

One man made it his mission to develop a narrative that would motivate minority children to exercise and eat proper diets so that they could avoid childhood and adult obesity. Griffith developed a children's storybook called *The Tale of Two Athletes: The Story of Jumper and The Thumper* with a companion workbook and workshop series. The games, activities, lecture, and didactic discussions successfully built trust between the researchers and the audience and inspired people to re-think their lifestyle choices (Griffith, Griffith, Cobb, & Oge, 2016).

Although not as stereotypically game-related as the Chicago Design Lab, this type of intervention incorporates interactive elements that support internalization of information and alteration of health behaviors.

Other attempts to reduce obesity have utilized gamification in smartphone applications that guide users through physical activity. For example, the Nike+ program uses a game-like approach wherein users check off exercises as they complete them. When evaluated using the transtheoretical model of change – a model that categorizes people on various levels depending on their willingness to change behaviors (Glanz et al., 2015) – this Nike+ application was only able to encourage those who had already decided to exercise more to keep exercising, and it was not able to change sedentary tendencies (Trevorrow, 2012). This may be due to the application's overall poor quality and inaccessibility to beginners.

Another study reviewing over 30 free smartphone coaching applications available on iPhone found that very few could meet basic standards described by the American College of Sports Medicine (Modave et al., 2015). The study scored the applications based on their aerobic, resistance, and flexibility training. Only 4-5 applications scored above 50% on any of these metrics. Overall, the applications were deemed inaccessible to beginners. Given the potential for gamification of physical activity via smartphone applications, this reveals a need to develop technically savvy programs that adhere to standardized guidelines and appeal to beginners that need encouragement as they change their health behaviors.

These types of narrative, interactive studies are, however, highly susceptible to bias. The narrative book report did not measure any long-term metrics in the children exposed to the book or workshops and the conclusions were based on qualitative opinions. The effect of interactive initiatives on obesity is difficult to assess even when effects are measured with quantities like

BMI due to the presence of many potential confounders. For example, a review of eight web-based interventions aimed at fighting childhood obesity found mixed results that indicated significant albeit short-term changes to weight metrics only if the interactive measure was combined with other components (Antwi et al., 2012). The changes that did occur may have been associated with peer pressure or parental influences rather than the program itself. This indicates a need for more research with clearer study designs and longer longitudinal approaches.

C. PEER-TO-PEER MEDICINE

Where there exists need, there exists opportunity. The process required to produce new technologies from pharmaceutical companies or other research institutions is long, arduous, and often out of touch with what consumers – that patient – want or need. This has prompted patients to use technology not only to empower their own health decisions but also to crowdsource their own solutions to medical problems. This type of grassroots problem-solving has proven surprisingly effectual. Patient-led groups, while not "experts" per se, have access to motivation and credibility that larger organizations lack. This enables them to rally other patients and their families around their cause. The subsequent cooperation, often facilitated by social media, makes it possible to compile large data sets and skill sets.

#We Are Not Waiting

One example of this medical grassroots collaboration is the *#WeAreNotWaiting* movement within the diabetes community. This group united at the DiabetesMind D-Data Exchange Event to build and share technologies via social media intended to increase patient access to their own health data and enable them to share the data with family and health providers (Omer, 2016). In many cases, this is facilitated by improving inter-operability between medical devices and personal devices such as smartphones. Diabetics find these options

invaluable as their chronic condition requires constant daily data monitoring that results in an overwhelming amount of information. Unstructured, the data stresses patients who feel responsible for evaluating it in front of physicians they only see once a year, especially since doctors see no real-time data.

For example, patients designed the "Nightscout Project" to help process diabetic information. Tired of waiting for researchers to finally put a more sustainable solution for insulin monitoring on the market, a parent of one type 1 diabetic decided to take matters into his own hands. The problem with the status quo monitoring systems was that they were unable to be checked remotely, a big problem for children who spend most their days away from their parents at school. This prompted the creation of the Nightscout Project, an open source code designed to help parents monitor their children's glucose levels on mobile devices (Lee, Hirschfeld, & Wedding, 2016). After creating the code for his son, the original developer published online through a social media platform and it was subsequently modified, utilized, and commented on by other users.

Although nominally a success story, this type of crowdsourcing does have some problematic implications. The code was not created or funded by large institutions, allowing it to reach its intended market instantaneously devoid of industry ties. That is, it was not attached to a money-making scheme. However, this also means that there was no standardized safety measure attached to the code, regulatory body monitoring its potential hazards, or formal body capable of accepting legal liability. As data sharing technologies improve, however, it is unlikely that these innovations will cease. Perhaps, the solution is to empower a regulating body such as the FDA to sanction or ban medical innovations. More reasonably, these situations necessitate a healthy

debate between ethicists, researchers, patients, and innovators to hash out the best way to promote innovation without exposing naive and desperate people to harm.

Patient-led Diagnosis

Patients are discovering not only their own treatment strategies but also their own diagnoses. Kim Goodsell, an active athlete from California, represents the success stories of such efforts (Liang, Goodsell, Grogan, & Ackerman, 2016). When diagnosed with two rare genetic disorders, arrhythmogenic right ventricular cardiomyopathy (ARVC) and Charcot-Marie-Tooth Type 2B1, Kim was convinced that there was a connection between the two. Kim's doctors were unconvinced, but she was just stubborn enough to Google up PubMed, a scientific literature search database, and dive into the literature herself. Kim is a college drop-out, but she muscled her way through the medical literature like she had muscled her way through multiple triathlons. She became very interested in the LMNA gene that was linked to physiologic complications that matched with her first-hand experiences. Goodsell eventually convinced her doctors to do a genetic test which confirmed her suspicions.

Goodsell was successful in her diagnosis because she had the time, the inclination, and the first-hand experiences necessary to ask the right questions and dig for the right answers. Physicians are often so concentrated on their own specialties and constrained by time that they do not think to connect disparate aspects of patients' histories. For example, Norrie Disease, an X-linked recessive disorder characterized by congenital blindness and progressive sensorineural hearing loss, typically falls to ear, nose, and throat doctors and geneticists. No one linked the disease to erectile dysfunction until the patient-led connection was established via conversations facilitated by the creation of the Norrie Disease Registry (Smith, Mullen, Graham, Sims, &

Rehm, 2012). This revelation prompted doctors to investigate the disease's extraocular clinical manifestation and find that it had significant vascular effects.

There are other, less rigorously monitored, social media platforms set up to connect people with rare disorders or genetic abnormalities. A whole subreddit for genetics (r/genetics) which has in the past functioned to connect people with similar genetic mutations. The Rare Genomics Institute, an international nonprofit, relies on crowdfunding to connect patients with researchers ("About Rare Genomics Institute," 2017). The institute also works with social media to help patients with rare disorders find each other and get centralized treatment so that data about their disorders is consolidated so that researchers have access to as much data as possible. There are many other examples of patients developing their own social communities to substantiate research with day-to-day insights that researchers are not party to and thereby identify effective treatments.[8]

These social networks can be especially potent for people with chronic disorders that struggle to manage both their disorders and their lives. A particularly moving of the impact social media can have on outlook was presented in the recent documentary film *Unrest* (Brea, 2017). *Unrest* follows the story of Jennifer Brea, a Harvard PhD student who became progressively ill with myalgic encephalomyelitis (ME), also known as chronic fatigue syndrome. At first misdiagnosed and belittled by physicians, Brea eventually found people with similar symptoms to her own via Youtube and Facebook. Connecting with them helped give her life meaning and helped her find effective treatment that her doctors did not know existed. Moreover, Brea was able to use social media contacts she established to set up a protest increasing international awareness of chronic fatigue syndrome. Brea then directed her own documentary

[8] One of the more creative examples is "Colontown," (http://www.colontown.org/) an online community for colorectal cancer survivors, patients, and caregivers. Community members are divided into neighborhoods that facilitate sharing personal stories, research discoveries, and drug developments.

and gave an extraordinarily successful Ted Talk. These communication methods could be classified as both patient to patient and patient to population. The overall goal is to increase funding and research for ME while reassuring the patients suffering from it that they are still valuable members of society.

Doctors are simply not asking the right questions. Moreover, patients may be the only party that can help connect the dots. These connections occur much more rapidly in the presence of shared information, whether in the form of open-access journals that Goodsell read, social platforms such as the Norrie Disease Registry, or documentaries like *Unrest*. Equally important is the communication between these informed patients and their physicians. The first section discussed many methods for improving the ability of doctors to ask the right questions. Narrative medicine, clinical empathy, cultural competency, etc. all function to help doctors take holistic histories so that they can work as detectives in conjunction with the patients, as partners, to find strange and often counter-intuitive connections between rare genetic disorders or congenital blindness and erectile dysfunction.

D. CHALLENGES

Patient-patient communication and patient empowerment is linked to emerging technologies. Unfortunately, many of these health information technologies are linked to political and economic – aka, insurance – interests. This leaves little incentive to empower health professional access to health information much less patient access to their own information. For example, the *Health Information Technology for Economic and Clinical Health Act of 2009 (Hitech Act)* was intended to facilitate greater healthcare efficiency and safety, but Health IT systems created by businesses chose profits over standardization (Kellermann & Jones, 2013). It is almost impossible to share data across hospitals and what data there is remains structured

around insurance codes rather than readability. To fulfill their potential, barriers such as usability, access, computer literacy, workflow issues, confidentiality concerns, etc. need to be addressed (Finkelstein et al., 2012).

In addition to the technology itself, there are issues with its implementation. The previous section discussed in further depth how technology often presents a barrier to doctor-patient interactions, distracting doctors from careful listening with checkboxes, electronic reminders, and a veritable sea of insurance billing codes. Implementation issues also beset patients. For example, open-source codes like the Nightscout program for type 1 diabetics has the potential to harm those who improperly install the code into devices or misinterpret information.

Speaking of properly installing code, technology-fueled healthcare communication also engender fear that computing power will concentrate in the hands of the elite few who can understand it or, through social (socioeconomic) circles, are exposed to it. After all, people in lower socioeconomic brackets may not have access to smartphones or the interned which enable communication over social media. Even if peer-to-peer medicine democratizes innovation, there is the chance that privacy and security will be compromised. There is nothing quite so sensitive as a person's health data, and current regulations such as the Health Insurance Portability and Accountability Act of 1996 (HIPAA) are not well-formulated to regulate crowdsourced data accumulations.

E. RECOMMENDATIONS

It is true that technology may not be available to some patients of lower socioeconomic r immigrant status. This is problematic considering people in these populations are often most at risk for chronic diseases like diabetes or obesity. The prevalence of smartphones in the household, however, has increased. Even those who do not have access to the internet usually

have texting services. At the very least, technology can be incorporated into people's lives via hospitals and wearable devices funded through insurance. After all, insurance companies also have stakes in preventing chronic diseases.

Given access to technology, hospitals and health care providers can set up sanctioned social media platforms. These will give patients opportunities to connect with others like themselves in a safe environment, ideally one monitored by trained professionals. This would facilitate the sharing of information such as new ideas for treatment or best practices. The difficulty in involving health practitioners in the social group is that it may subsequently lack some of the identity present in groups like *#WeAreNotWaiting* that were created by motivated patients and their families. One way to get around this would be to treat physician or nurse participants as consultants while patients and family organize and facilitate interactions.

Patients also can receive communications from nontraditional sources and in nontraditional, "gamified" manners. Making complying with medical advice fun is a good way to help patients adhere to recommendations that often impact personal decisions. Patients are more likely to internalize information given to them in interactive settings than in consults that resemble lectures. Moreover, gamifying lifestyle choices like diet and exercise helps people keep track of what they eat and when are physically active. Given the positive implications and potential of this game approach, it seems advantageous to replace traditional consults and counseling with devices that are set up to track and encourage patients. This is especially likely to result in positive outcomes if insurance providers can be convinced to subsidize or pay for the distribution of devices or smartphone applications.

IV. COMMUNITY HEALTH WORKERS

Community health workers (CHW) or community-based health workers (CBHWs) have the potential to bridge the gap between healthcare providers working within hospital or clinical settings and patient communities. The term "CHW" encompasses various roles and responsibilities within the community, ranging from educators for specific diseases to general health advocates. These individuals, often community members themselves, spearhead public health initiatives at the behest of local governments.[9] These initiatives can range from screening campaigns to exercise classes such as Zumba. Using community health workers ensures that the people themselves have a stake in the programs and gives funding agencies an ear on the ground to ensure their efforts are culturally competent and fulfilling actual needs in the most efficient way possible.

Unfortunately, these campaigns are often hampered by poor communication between community health or public health professionals and healthcare providers. Healthcare providers are often unaware of community health initiatives and thus neglect to recommend their patients to the programs. Community health workers lack medical knowledge about their participants and the technical capability to track their progress over time. This makes it difficult for public health professionals to merge the two metrics and make recommendations about population health. This is not a new problem, and facilitating better communication and collaboration between health care providers and public health workers is not a new idea. Indeed, the medicine and public health initiative (MPHI) has encouraged the disciplines to work together since the early 1990s (Beitsch, Brooks, Glasser, & Coble, 2005). More recently, community health workers were

[9] The US Centers for Disease Control and Prevention updated its prevention of chronic disease model in 2014 (Bauer, Briss, Goodman, & Bowman, 2014). Community resources that help patients manage chronic conditions comprise one of the four major initiatives crafted to promote population health and prevent disease. CHWs are an integral part of the team that organizes and recruits people to use these resources.

recognized in the Affordable Care Act as essential members of the healthcare workforce with the potential to help improve clinical outcomes (Rosenthal et al., 2010).

A. RALLYING AROUND CHRONIC DISEASES

Community health workers are especially important to the discourse on chronic diseases and chronic disease prevention due to their potential to engender community-wide changes. They help reduce boundaries to access and educate the public within the cultural subtext of the community. Unlike healthcare providers who typically focus on disease presentations, community health workers can train patients to surmount socioeconomic and behavioral barriers that prevent them from acting on medical advice. They help at-risk populations make their own health decisions by supporting individual paradigm shifts during their daily lives outside of the doctor's office. In this way, chronic diseases can not only be managed but also prevented with upstream interventions. Although these types of interventions have been applied to many diseases as well as multiple diseases at once, CHW campaigns most commonly focus on cancer prevention and cardiovascular disease (K. Kim et al., 2016). Most campaigns either work to reduce disease risk via lifestyle changes or help patients keep up with their medications, medical visits, and measurements.

Controlling with Cooperation

One way to ensure community health workers are meeting patients' medical needs is to link them up with community health workers based on conversations that occur in the doctor's office. Collaborating with doctors enables community health workers to quantitatively measure the effect of their interventions. Facilitating care between providers and community health workers benefits patients too. For example, a recent clinical study comparing the efficacy of collaborative goal-setting for smoking, blood pressure, diabetes, or obesity (a process wherein

providers helped patients set specific disease management goals) with goal-setting plus community health worker support hopes to find that integrating community health results in better outcomes (Kangovi et al., 2017). Community health workers in the study supplemented care with action-plan discussions, hands-on support, and social networking.

A Family Affair

Many community health programs like the Kin Keeper cancer prevention intervention hope to engage entire families in protective health behavior. After all, families create a supportive environment and encourage each other to stick to health goals. CHWs from the Kin Keeper program identify willing women who then invite their family members over to their homes for an educational intervention (Roman, Zambrana, Ford, Meghea, & Williams, 2016). As the authors report, reaching out to families is important not only so that they can help women get adequate screening for cancer, as is the case in this specific intervention, but also as a means of collaborating with patients to reach entire communities.

Engaging At-Risk Populations: A Latin(x) Focus

Low-income minorities face higher risks for cardiovascular diseases, obesity, and diabetes due to high rates of sedentary lifestyles, poor diet, and limited access to health care. Unfortunately, populations from racial or ethnic minorities such as African Americans, Hispanics, or Asians are typically difficult to recruit for interventions and demonstrate high attrition rates (Carroll et al., 2011). Interestingly, this difficulty seems tied to greater lack of interest and higher no-show rates than similar populations of Anglo backgrounds (35.4% blacks vs. 24.3% whites were made ineligible due to lack of interest or a no-show; $p < 0.01$) (Frierson et al., 2008). Thus, it is important to find ways to engage the interest (change the perceived norm)

of the community by making it easy for them to participate, providing culturally grounded reasons for them to engage, and tapping into emotional incentives.

Interventions by CBHWs are typically successful – and cost-effective – when partnering with predominantly low-income, minority-majority communities in comparison to purely clinical practices (K. Kim et al., 2016). For example, *promatores*, or community health workers from the target (Latino) population who aid with interventions, effectively channel the cultural interests of Latin(x) groups. A study within the San Diego trained *promotores* in how to conduct aerobics classes – including dance and Zumba – and found that the subsequent courses improved physical fitness (systolic blood pressure, waist circumference, etc. $p<0.01$) and decreased perceived barriers ($p<0.05$) (Ayala & San Diego Prevention Research Center, 2011)[10]. Another *promatore*-based study in Los Angeles providing a 6-month "Lifestyle Behavior Intervention" compared to baseline improved dietary habits ($p<0.01$), physical activity ($p=0.04$), waist circumference ($p=0.04$, and cardiovascular disease knowledge ($p<0.001$) (Koniak-Griffin et al., 2015). *Promatores* can couch interventions within cultural backgrounds and, as part of the community, have unique insight into how to reduce perceived barriers. They serve as peer models able to demonstrate and lead others toward positive deviance.[11]

Various other studies indicate the success CHWs had providing a multitude of services, including managing care, social support, health education and counseling, or patient navigation (K. Kim et al., 2016). For example, individualized CHW sessions delivered in the homes of adult

[10] It is interesting to note that the study also decreased self-efficacy and reported that self-efficacy correlates poorly with physical activity amongst Latino populations. This is concerning as physical activity is an important component of managing many chronic diseases and necessitates further studies on innovative practices.

[11] *Curanderos*, traditional Hispanic healers that practice folk medicine may also present another avenue for increasing community engagement. Research indicates that Hispanic individuals often resort to these alternative practices for treatment because they do not have enough money to see a doctor or they feel that the medical system does not respect their cultural beliefs (Favazza Titus, 2014).

Latinos with diabetes significantly reduced ($p < 0.05$) fasting glucose concentration in comparison to controls (Perez-Escamilla et al., 2015). The beneficial effect Perez-Escamilla et al. could impart is at least in part due to their commitment to integrating culturally competent CHWs into the healthcare management team and moving their practice from the clinic or telephone to people's homes. Moreover, the study included a post-intervention maintenance period. Longitudinal practices are important for chronic diseases that necessitate lifestyle changes over longer periods than most studies provide. Even the authors of a study that tracked the glycemic control of Mexican Americans with diabetes in Chicago over a 2-year long CHW intervention acknowledged their inability to facilitate long-term follow-up as a major limitation (Rothschild et al., 2014). There is a need to establish long-term quality-of-care investigations establishing the efficacy of care and cost-benefit impact of community efforts linked to the medical results of hospital patients.

B. TECHNOLOGY AND COMMUNITY HEALTH

Mobile technology has emerged in recent years as the solution to the logistical constraints encountered when working in low-resource settings. A systematic review of CHW literature revealed that mobile health (mHealth) technology has been used for a broad range of applications, including health education, text-based reminders, collecting health data in the field, and interpersonal health education (Braun, Catalani, Wimbush, & Israelski, 2013). Although these efforts are promising, most were constrained to small-scale, preliminary pilot projects. More robust quality assessments would necessitate longitudinal practices.

C. RUNNING SUCCESSFUL PROGRAMS

The integration of community health workers into healthcare systems is a relatively new concept. For the most part, community efforts exist in parallel rather than conjunction with medical provider efforts, especially since community health and public health worker efforts

seek to prevent the influx of business to medical providers. Current studies and publications, however, stress the importance of legitimizing CHW efforts and interdisciplinary integration. As with any innovation, it is important that organizations determine best practices for training, management, and implementation.

Measuring Success

Before the business leaders of medical organizations can advocate for the inclusion of CHWs, they must establish that they are worthwhile investments. This means that there must be a stable and realistic method for measuring the CHW program success. Community health interventions aim to reduce or prevent a multitude of diseases across a heterogeneous population. This makes it difficult to measure – or even define – success. Programs in low-income areas that often do not have the technologies or manpower to track participants over time particularly struggle with generating metrics for evaluation. Without robust statistical analysis, it is all too easy to push money into initiatives that sound good or generate good publicity without guaranteeing they also produce good results.

Fortunately, the policymaker-initiated shift away from disease-specific biomedical research towards 'upstream' investigations – research targeting socioeconomic determinants of health such as health literacy, access to care, etc. – necessitated the development of new research techniques. Kangovi et al. tackled the problem of multiple diseases and multiple outcomes by enabling patients in the population to select one primary disease to focus on during the study (Kangovi et al., 2017). Changes in variables specific to the primary disease (for example, HbA1c levels for diabetes or BMI for obesity) were then incorporated into an overall stratum-specific multivariate analysis of variance (MANOVA). The authors argue that incorporating multi-

disease metrics into one MANOVA model will present more robust results than traditional public health outcome measures such as self-rated health or mortality.

D. CHALLENGES

Community health interventions are often beset by poor management, limited resources, and short-term goals. As discussed in the previous section, this is further complicated by difficulties measuring multiple disease metrics. This makes it difficult to prove to administrators or leadership teams that CHW interventions are worthwhile investments, especially since CHWs often lack legitimate certification or established funding schemes (Rosenthal et al., 2010). Regardless, the role of CHWs in the healthcare delivery scheme has expanded since the Affordable Care Act expressed support for their integration (Martinez, Ro, Villa, Powell, & Knickman, 2011). The integration of CHWs into clinical practices has not, however, always proven positive. Transitioning to the clinic sometimes causes CHWs to lose aspects of their unique identity as they become extensions of the clinic rather than independent operators.

E. RECOMMENDATIONS

Community health workers encompass a multitude of professionals uniquely united by shared life experiences that provide them with intimate knowledge of the needs and culture of the communities they serve. Their integration with the community enables them to develop the trust that is often missing in doctor-patient relationships, enabling them to effectively translate physician recommendations into realistic practices. Through better communication with healthcare providers, they may also be able to refer patients to physicians at early onset of diseases. For example, CHWs could help low health-literacy patients with early signs of diabetes seek care before their disease progresses to the point of diabetic neuropathy and foot ulcers that require amputation.

CHWs cannot continue to exist, however, without accreditation and some form of compensation. States need to develop processes that legitimize the work of CHWs. Legitimization via licensing would make it easier for providers and constituents need to advocate for government payment programs or insurance compensation for CHW programs. Other potential funding sources include large companies that are currently losing money to health insurance for employees with chronic diseases. Advocates could utilize the beneficial results of CHW studies to argue the community liaisons could reduce the cost of care by encouraging healthy practices. A public-private practice involving both governments and private corporations could potentially reach a wider population and establish a longitudinal, stable program.

V. IMPLICATIONS

For the most part, healthcare systems operate independently. The model I propose, however, has implications for both US healthcare policy and global health work. The ACA (Obamacare) had many provisions for cultural competency and community healthcare workers, acknowledging that their actions could help reduce healthcare costs by preventing diseases upstream of their expensive consequences. It is important that we continue to advocate for these advances and, through research, determine the best advances to advocate for.

Developing a good communication model has implications as well for the global health sphere. Establishing integrative practices could change the way that we provide aid for developing countries. For example, the participation of grassroots organizations, something that has proven effective in the past for many aid initiatives, is analogous to involving community healthcare workers in healthcare organizations. Thus, changing the way that we approach chronic diseases could make global aid and global care more cost-effective.

A. UNITED STATES POLICY

With the current turmoil in the White House, healthcare policies seem rather subject to change. This presents both a responsibility and an opportunity for informed individuals to advocate for the underrepresented and disadvantaged. This certainly includes those who suffer from chronic diseases, especially since a large majority of that cohort are ethnic minorities.

Although most the battles and discussions so far have concerned economic issues such as the reduction of Medicaid, there is also a need to insure communication competencies are included in the national discussion. Even a small subsection about cultural competency can help shift institutional perspectives so that communication training and competency assessments for physicians increase. Shifts in the regulations also offer opportunities to include patient-centered communication, whether patient-to-patient or patient-to-doctor, with discussions of communication competencies supported by the national government.

Policies and Recommendations

The Patient Protection and Affordable Care Act (ACA), or "Obamacare," placed emphasis on primary care and preventative medicine. As can be surmised by the research presented in Section II, there is growing consensus amongst researchers and medical professionals that patient-centered communication skills are integral to facilitating effective care in these areas. This has resulted in various recommendations advocating for greater concentration on communication competencies in medical education. For example, the Medicare Payment Advisory Commission (MedPAC) recommended in 2009 that graduate medical education payments should be tied to the development of communication skills (Committee, 2009). Similarly, the 2006 American Medical Association Ethical Force Consensus Report emphasized the importance of improving patient-centered communication and encouraged

organizations to develop communication initiatives, monitoring programs, and internal policies (AMA, 2006).

There are many potential strategies and policies that would support this purported emphasis on patient-centered communication. These include providing training grants for medical educators, including communications competencies in medical certifications, creating incentive or pilot programs, and tying communication reviews to Medicare reimbursement schedules (Levinson, Lesser, & Epstein, 2010). These recommendations involve policy changes at the national or organizational levels to the ways medical professionals receive funding.

Obamacare

Obamacare addressed many of these policy initiatives and emphasized the importance of training doctors how to establish good doctor-patient relationships. This emphasis jump-started many conversations about patient-centered communication and cultural competency even if the direct results of its broad policy statements are difficult to pin down. The large piece of legislation included statements advocating for increased diversity in the healthcare workforce (APHA, 2011), the development and evaluation of culturally competent curriculum, and loan repayment preferences for medical professionals who displayed cultural competency ("Patient Protection and Affordable Care Act," 2010). Medicare reimbursements under the Affordable Care Act were tied to patient satisfaction scored and value-based care, linking the doctor's interpersonal skills to payment schedules. Moreover, a Medicaid rule change in 2013 (*Medicaid and Children's Health Insurance Programs: Essential Health Benefits in Alternative Benefit Plans, Eligibility Notices, Fair Hearing and Appeal Processes, and Premiums and Cost Sharing; Exchanges: Eligibility and Enrollment; Final Rule* 2013) allows patients to bill insurance for CHW preventative services if they were recommended by a licensed practitioner.

These initiatives reached outside of their direct purview to prompt other efforts. For example, the leadership team behind both "Empathetics" and "Oncotalk," empathy training courses developed for physicians, cited the Affordable Care Act as an incentive for their work (Boodman, 2015). These programs are already having positive impacts on patients and doctors. On the policy side of things, the ACA's interest in expanding health professional training in cultural competency was enacted in conjunction with the Office of Minority Health in the Department of Health and Human Services' revised National Standards for Culturally and Linguistically Appropriate Services (CLAS) (Adepoju, Preston, & Gonzales, 2015). The new CLAS emphasizes continuing evaluation of leadership, language assistance, and patient-centered communication competencies to support their principle standard:

> "Provide effective, equitable, understandable, and respectful quality care and services that are responsive to diverse cultural health beliefs and practices, preferred languages, health literacy, and other communication needs." (Koh, Gracia, & Alvarez, 2014)

Both initiatives are steps in the right direction. Granted, the organizations may have chosen to emphasize healthcare communication on their own, but their efforts were legitimized by the provisions highlighted in the Affordable Care Act.

The ACA's effects were not all positive. Indeed, the negative ramifications of its incentives for health information technology were briefly touched on in another section. The problems associated with implementing these new electronic healthcare records revolved around issues of patient access to information and interoperability between institutions. This created more communications problems than it solved and fostered barriers between doctors and

patients. It is difficult for a doctor to be empathetic when they must work overtime checking boxes and filling out forms.

The Potential Impact of Trumpcare

Trump's presidency has the potential to undermine the efforts put in motion under Obama. Already, President Trump's animosity towards immigrants has already created cultural tensions and his proposed executive order banning immigrants from majority Muslim countries has the potential to block diversity amongst healthcare professionals (Masri & Senussi, 2017). This is especially concerning as harsher stances on immigration will make it more difficult for minorities to have access to doctors and nurses who can understand their cultural backgrounds and speak their languages fluently.

Decreasing diversity is only one of the many effects Trump may have on healthcare. The extent to which Trump will alter what the Affordable Care Act established is yet uncertain. It certainly seems that the Republican administration is not overly concerned with the health needs of low SES minorities. There are, however, economic priorities that may push the administration to address chronic diseases.[12] It will be up to medical professionals, community healthcare workers, and constituents to continue to advocate for policies that support medical communication and community integration. Even if the support provided by the ACA for these efforts gets written out of national policy, it is possible for local governments to provide monetary support and publicity to continue the forward momentum.

B. GLOBAL HEALTH ISSUES

Communication competencies are integral not only to medical care in the United States but also to global health. This especially applies to international aid missions which are often

[12] Researchers estimate that the most common chronic diseases consume more than $1 trillion annually and expect that number to reach $6 trillion by the end of the century (DeVol et al., 2007).

seen as problematic due to their disregard of cultural values which often leads to well-meaning but misguided initiatives. As globalization increases, it is important that medical missionaries and international organizations develop protocols to train workers in culturally-specific communications techniques. At the very least, health workers can be made aware of the general guidelines explored in literature pertaining to clinical empathy, narrative medicine, or other such interpersonal health communication categories.

Undergraduate Medical Rotations

Many medical students demonstrate interest in global health issues and international away rotations but fear they are not equipped with enough cultural knowledge to make a positive difference (Castillo et al., 2012). This fear, unfortunately, is justified. little data exists evaluating the benefits and harms of global health field experiences and few programs ensure they align with established ethics guidelines (Crump, Sugarman, & Working Group on Ethics Guidelines for Global Health, 2010). In addition, the best international aid is often just support given to grassroots organizations initiated by people who grew up in the community.

Despite these downsides, having international experiences is invaluable to healthcare professionals whether they are volunteers or natives. Practicing in a country with fewer resources can inspire innovative thinking and compassion for those who travel and spend time in the area. The medical professionals they aid gain knowledge which is often accompanied by much-needed supplies. These positive experiences, however, hinge on establishing clear goals that incorporate both ethical considerations and sustainability guidelines. The onus rests on international organizations to address these concerns and work together to ensure their impacts are truly beneficial to the communities they serve.

VI. A THREE-PRONGED STRATEGY: COMMUNITY, PEOPLE, AND PROVIDERS

Each of the three previous sections demonstrated the proven benefits of communication efforts for healthcare providers, patients, and community health workers. Integrated together, however, these components have the potential to drastically change the way chronic diseases are treated for the better. Ideally, patients would work with their doctors to carry out necessary medical procedures, connect with their peers to identify and personalize best practices, and participate in CHW events that support healthy lifestyles. Such an interdisciplinary model could be made possible through the incorporation of technology, the use of incentives, and the development of training protocols.

A. TECHNOLOGY

Technology has the potential to link patients, community health workers, and medical professionals. Improving cross-disciplinary communication benefits both hospitals and communities by modulating hospital traffic, improving the health of the country's workforce, and providing care for resource-poor areas via telehealth. Researchers also have much to gain from technology. The Demographic Transition from infectious diseases to chronic conditions created a need for studies incorporating longitudinal, population-based data. Population analyses help establish links between lifestyle habits and disease presentations that require extended periods of time to develop.

Technology may also provide a means for integrating a patient's narrative into longitudinal medical practice. A truly useful electronic healthcare record (EHR) system would allow every physician that interacts with a patient, regardless of institution, access a patient's entire medical history. Ideally, this would include more than just records of insurance billings.

Pertinent information could include important cultural and economic considerations, participation in CHW programs, and self-efficacy scores. EHRs could also become critical touchpoints of communication between CHWs and healthcare providers.

Of course, technological implementations are complicated by the potential costs involved for both patients and hospital systems. Most people nowadays have access to smartphones or some sort of cellular device. The only cost for most patients, then, would be the time required to log into health tracking applications or connect on social networks. Best practices for the implementation of new technologies would include communication training programs for providers and trainees that emphasize interdisciplinary collaboration and establish clear standards for communication skills that can be assessed.

B. TRAINING

Although technology seems like a quick fix to communication problems, proper integration of new resources requires training. Providers need to be taught how to use technology to better incorporate concepts like cultural competency, structural competency, and narrative medicine into their practices. Patients may need training in how to use hospital-provided communication or medical monitoring tools. CHWs require more efficient protocols for keeping track of patients and facilitating interactions with healthcare providers.

Training is easy to recommend but difficult to define and difficult to administer, especially for busy healthcare professionals. The best way to ascertain participation may be to integrate communication into graduate education. This could take the form of an interdisciplinary course focused on experiential learning and research that allows medical professionals and public health students to work together on real community health programs with real impacts. In that way, students would not be coerced into what many may think of as

time-wasting courses. Current courses could also include the competencies discussed in the provider-patient communication section, perhaps by using case studies that describe theoretical patients using cultural as well as medical factors.

C. INCENTIVES

Realistically, it is unlikely that providers, patients, or the community will spontaneously initiate communications without some sort of incentive. As previously discussed, this could come in the form of policies that enable compensation for interaction across the three disciplines or special reimbursements for providers that have cultural competency training. These incentives could also be focused on the patient's end. After all, the onus primarily rests on the individual to seek treatment from both CHW and healthcare provider. Commercial businesses would likely support these endeavors given proof that encouraging their employees to seek better health in their communities would reduce their overall healthcare costs.

VII. CONCLUSION

As the global burden of chronic diseases increases, innovative new strategies are needed to both provide upstream preventative measures to reduce the incidence of chronic diseases and help manage existing conditions. Treatment and prevention are complicated by the personal nature of these diseases, most of which derive from poor diet and exercise choices. Doctors cannot write chronic diseases away with a prescription. However, an interdisciplinary healthcare model that encourages collaboration between providers, patients, and the community could overcome these obstacles.

Various isolated methods to improve communication in these three sectors have already proven successful. Healthcare providers demonstrate improved outcomes when trained to interact collaboratively in a shared decision-making capacity with their patients. Provider-

focused communications training include narrative medicine techniques that encourage doctors to consider more than the typical sterile patient history, cultural or structural competency education, and empathetic communications training. These techniques have all proven beneficial to both providers and patients in isolation, but the studies are limited by their short duration and small sample sizes. Moreover, the field would benefit from an integrative approach that combines communication strategies and techniques. All patients, especially patients with chronic diseases would receive better care from medical professionals that are committed to creating care plans that best meet their patient's priorities.

Patients on their own have developed better ways to talk amongst themselves and with their physicians. Patient-centered communication techniques often incorporate new technologies and educational strategies. For example, patients have created online social communities that share medical research, personal stories, and observations. Working together, patients not only develop coping techniques that help them manage their chronic conditions but also accumulate data that has often led to medical discoveries. Soon, mobile health (mHealth) and shared decision-making will drive the democratization of health data and the emergence of truly personalized medicine. Before that can happen, however, the medical system needs to devise a better way to organize, communicate, and safely share patient health data.

Community health workers (CHWs) are uniquely suited to connect these provider- and patient-focused communication strategies. Since they are typically members of the community they serve, CHWs are often more culturally competent and capable of fostering trusting relationships than clinical workers. They can use their connection to the community to organize programs that benefit patient health and help providers reach their care goals. Unfortunately, their work is complicated by inadequate funding, difficulties legitimizing their place in the

healthcare team, and technical problems with tracking patients so that their clinical outcomes can be correlated to their activities in the community.

A healthcare system truly committed to improving patient experiences and reducing the burden of chronic diseases would integrate all three of these strategies into a cohesive system. For that to happen, medical professionals, public health workers, and community health workers should all learn how to work on interdisciplinary projects that incorporate technological communication strategies early on in their training. Existing time constraints necessitate creative methods to ensure that students receive this training in a meaningful and efficient manner. This could be achieved via experiential learning that allows students to take leadership positions and have a real impact on patient populations.

Overall, there is a need for more comprehensive, longitudinal, and interdisciplinary studies investigating the beneficial impact of improved health communication in all three of these sectors on patient outcomes. Proof of concept could then lead to policies and funding supporting improved medical communication, whether that be by encouraging medical schools to teach empathetic communication strategies or requiring health insurance companies to cover community health worker programs. Given the proper resources, attractive incentives, and reduced barriers, health could become a focus of modern society rather than a source of consternation for the many individuals currently choosing unsustainable lifestyles.

References

About Rare Genomics Institute. (2017). Retrieved from http://www.raregenomics.org/about-us/

Adepoju, O. E., Preston, M. A., & Gonzales, G. (2015). Health Care Disparities in the Post-Affordable Care Act Era. *Am J Public Health, 105 Suppl 5*, S665-667. doi:10.2105/AJPH.2015.302611

AMA. (2006). *An Ethical Force Program consensus report: improving communication, improving care*. Retrieved from Chicago (IL):

Antwi, F., Fazylova, N., Garcon, M. C., Lopez, L., Rubiano, R., & Slyer, J. T. (2012). The effectiveness of web-based programs on the reduction of childhood obesity in school-aged children: A systematic review. *JBI Libr Syst Rev, 10*(42 Suppl), 1-14. doi:10.11124/jbisrir-2012-248

APHA. (2011). *The Affordable Care Act's Public Health Workforce Provisions: Opportunities and Challenges*. Retrieved from Washington, DC: https://www.apha.org/~/media/files/pdf/topics/aca/apha_workforce.ashx

Asan, O., Young, H. N., Chewning, B., & Montague, E. (2015). How physician electronic health record screen sharing affects patient and doctor non-verbal communication in primary care. *Patient Educ Couns, 98*(3), 310-316. doi:10.1016/j.pec.2014.11.024

Ayala, G. X., & San Diego Prevention Research Center, T. (2011). Effects of a promotor-based intervention to promote physical activity: Familias Sanas y Activas. *Am J Public Health, 101*(12), 2261-2268. doi:10.2105/AJPH.2011.300273

Bauer, U. E., Briss, P. A., Goodman, R. A., & Bowman, B. A. (2014). Prevention of chronic disease in the 21st century: elimination of the leading preventable causes of premature death and disability in the USA. *Lancet, 384*(9937), 45-52. doi:10.1016/S0140-6736(14)60648-6

Beach, M. C., Price, E. G., Gary, T. L., Robinson, K. A., Gozu, A., Palacio, A., . . . Cooper, L. A. (2005). Cultural competence: a systematic review of health care provider educational interventions. *Med Care, 43*(4), 356-373.

Beitsch, L. M., Brooks, R. G., Glasser, J. H., & Coble, Y. D., Jr. (2005). The medicine and public health initiative ten years later. *Am J Prev Med, 29*(2), 149-153. doi:10.1016/j.amepre.2005.04.005

Blumgart, H. L. (1964). Caring for the Patient. *N Engl J Med, 270*, 449-456. doi:10.1056/NEJM196402272700906

Bonvicini, K. A., Perlin, M. J., Bylund, C. L., Carroll, G., Rouse, R. A., & Goldstein, M. G. (2009). Impact of communication training on physician expression of empathy in patient encounters. *Patient Educ Couns, 75*(1), 3-10. doi:10.1016/j.pec.2008.09.007

Boodman, S. (2015). How to Teach Doctors Empathy. *The Atlantic*. Retrieved from https://www.theatlantic.com/health/archive/2015/03/how-to-teach-doctors-empathy/387784/

Braun, R., Catalani, C., Wimbush, J., & Israelski, D. (2013). Community health workers and mobile technology: a systematic review of the literature. *PLoS One, 8*(6), e65772. doi:10.1371/journal.pone.0065772

Brea, J. (Writer). (2017). Unrest [Film]. In J. Brea (Producer).

Burack, J. H., Irby, D. M., Carline, J. D., Root, R. K., & Larson, E. B. (1999). Teaching compassion and respect. Attending physicians' responses to problematic behaviors. *J Gen Intern Med, 14*(1), 49-55.

Butow, P. N., Maclean, M., Dunn, S. M., Tattersall, M. H., & Boyer, M. J. (1997). The dynamics of change: cancer patients' preferences for information, involvement and support. *Ann Oncol, 8*(9), 857-863.

Carroll, J. K., Yancey, A. K., Spring, B., Figueroa-Moseley, C., Mohr, D. C., Mustian, K. M., . . . Fiscella, K. (2011). What are successful recruitment and retention strategies for underserved populations? Examining physical activity interventions in primary care and community settings. *Transl Behav Med, 1*(2), 234-251. doi:10.1007/s13142-011-0034-2

Castillo, J., Castillo, H., Ayoub-Rodriguez, L., Jennings, J. E., Jones, K., Oliver, S., . . . Dewitt, T. (2012). The resident decision-making process in global health education: appraising factors influencing participation. *Clin Pediatr (Phila), 51*(5), 462-467. doi:10.1177/0009922811433555

Charon, R. (2001). The patient-physician relationship. Narrative medicine: a model for empathy, reflection, profession, and trust. *JAMA, 286*(15), 1897-1902.

Charon, R. (2004). Narrative and medicine. *N Engl J Med, 350*(9), 862-864. doi:10.1056/NEJMp038249

Committee, M. P. A. (2009). *Report to the Congress: improving incentives in the Medicare program*. Retrieved from Washington (DC):

Crump, J. A., Sugarman, J., & Working Group on Ethics Guidelines for Global Health, T. (2010). Ethics and best practice guidelines for training experiences in global health. *Am J Trop Med Hyg, 83*(6), 1178-1182. doi:10.4269/ajtmh.2010.10-0527

DasGupta, S., & Charon, R. (2004). Personal illness narratives: using reflective writing to teach empathy. *Acad Med, 79*(4), 351-356.

Davis, M. H. (1980). A Multidimensional Approach to Individual Differences in Empathy *JSAS Catalog of Selected Documents in Psychology, 10*, 85.

DeVol, R., Bedroussian, A., Charuworn, A., Chatterjee, A., Kim, I. K., Kim, S., & Klowden, K. (2007). *An Unhealthy America:The Economic Burden of Chronic Disease* Retrieved from http://health-equity.lib.umd.edu/847/

DiLalla, L. F., Hull, S. K., Dorsey, J. K., Department of, F., & Community Medicine, S. I. U. S. o. M. C. U. S. A. l. s. e. (2004). Effect of gender, age, and relevant course work on attitudes toward empathy, patient spirituality, and physician wellness. *Teach Learn Med, 16*(2), 165-170. doi:10.1207/s15328015tlm1602_8

Dow, A. W., Leong, D., Anderson, A., Wenzel, R. P., & Team, V. C. U. T.-M. (2007). Using theater to teach clinical empathy: a pilot study. *J Gen Intern Med, 22*(8), 1114-1118. doi:10.1007/s11606-007-0224-2

Elliot M. Hirsch, M. (2007). The Role of Empathy in Medicine: A Medical Student's Perspective. *Virtual Mentor, 9*(6), 423-427.

Epstein RM, S. R., Jr. (2007). *Patient-Centered Communication in Cancer Care: Promoting Healing and Reducing Suffering.* Bethesda, MD: NIH.

Epstein, R. M., & Street, R. L., Jr. (2011). The values and value of patient-centered care. *Ann Fam Med, 9*(2), 100-103. doi:10.1370/afm.1239

Favazza Titus, S. K. (2014). Seeking and Utilizing a Curandero in the United States: A Literature Review. *J Holist Nurs, 32*(3), 189-201. doi:10.1177/0898010113512560

Finkelstein, J., Knight, A., Marinopoulos, S., Gibbons, M. C., Berger, Z., Aboumatar, H., . . . Bass, E. B. (2012). Enabling patient-centered care through health information technology. *Evid Rep Technol Assess (Full Rep)*(206), 1-1531.

Finney Rutten, L. J., Agunwamba, A. A., Greene, S. M., Mazor, K. M., Ebbert, J. O., St Sauver, J. L., & Dearing, J. W. (2014). Enabling patient-centered communication and care through health information technology. *Journal of Communication in Healthcare, 7*(4), 255-261. doi:10.1179/1753807614Y.0000000067

Finney Rutten, L. J., Hesse, B. W., St. Sauver, J. L., Wilson, P., Chawla, N., Hartigan, D. B., . . . Arora, N. K. (2016). Health Self-Efficacy Among Populations with Multiple Chronic Conditions: the Value of Patient-Centered Communication. *Advances in Therapy, 33*(8), 1440-1451. doi:10.1007/s12325-016-0369-7

Finset, A. (2012). "I am worried, Doctor!" Emotions in the doctor-patient relationship. *Patient Educ Couns, 88*(3), 359-363. doi:10.1016/j.pec.2012.06.022

Friedberg, M. W., Chen, P. G., Van Busum, K. R., Aunon, F. M., Pham, C., Caloyeras, J. P., . . . Tutty, M. (2013). *Factors Affecting Physician Professional Satisfaction and Their Implications for Patient Care, Health Systems, and Health Policy*: RAND Corporation.

Frierson, G. M., Williams, D. M., Dunsiger, S., Lewis, B. A., Whiteley, J. A., Albrecht, A. E., . . . Marcus, B. H. (2008). Recruitment of a racially and ethnically diverse sample into a physical activity efficacy trial. *Clin Trials, 5*(5), 504-516. doi:10.1177/1740774508096314

Garden, R. (2009). Expanding clinical empathy: an activist perspective. *J Gen Intern Med, 24*(1), 122-125. doi:10.1007/s11606-008-0849-9

Gee, P. M., Greenwood, D. A., Paterniti, D. A., Ward, D., & Miller, L. M. (2015). The eHealth Enhanced Chronic Care Model: a theory derivation approach. *J Med Internet Res, 17*(4), e86. doi:10.2196/jmir.4067

Gilliam, M., Jagoda, P., Heathcock, S., Orzalli, S., Saper, C., Dudley, J., & Wilson, C. (2016). LifeChanger: A Pilot Study of a Game-Based Curriculum for Sexuality Education. *J Pediatr Adolesc Gynecol, 29*(2), 148-153. doi:10.1016/j.jpag.2015.09.008

Gilliam, M., Orzalli, S., Heathcock, S., Sutherland, E., Jagoda, P., Menendez, A., & Ojengbede, O. (2012). From intervention to invitation: reshaping adolescent sexual health through story telling and games. *Afr J Reprod Health, 16*(2), 189-196.

Girgis, A., & Sanson-Fisher, R. W. (1995). Breaking bad news: consensus guidelines for medical practitioners. *J Clin Oncol, 13*(9), 2449-2456.

Glanz, K., Rimer, B., & Viswanath. (2015). *Health Behavior: Theory, Research, and Practice* (Fifth Edition ed. Vol. John Wiley & Sons, Inc.). Montgomery Street, Suite 1000, San Francisco, CA.

Griffith, M., Griffith, J., Cobb, M., & Oge, V. (2016). The Use of Narrative as a Treatment Approach for Obesity: A Storied Educational Program Description. *Perm J, 20*(3), 102-106. doi:10.7812/TPP/15-029

Guilbert, J. J. (2003). The world health report 2002 - reducing risks, promoting healthy life. *Educ Health (Abingdon), 16*(2), 230. doi:10.1080/1357628031000116808

Habash, D. L. (2015). Unfolding, Embracing, and Reflecting on the Narrative Within Nutrition and Dietetics: Does the Patient's Story Help the Dietitian to Impact Health Behaviors? *Topics in Clinical Nutrition, 30*(2), 122-126. doi:10.1097/tin.0000000000000031

Halpern, J. (2003). What is clinical empathy? *J Gen Intern Med, 18*(8), 670-674.

Henry, S. G., Holmboe, E. S., & Frankel, R. M. (2013). Evidence-based competencies for improving communication skills in graduate medical education: A review with suggestions for implementation. *Medical Teacher, 35*(5), 395-403. doi:10.3109/0142159X.2013.769677

Henry-Tillman, R., Deloney, L. A., Savidge, M., Graham, C. J., & Klimberg, V. S. (2002). The medical student as patient navigator as an approach to teaching empathy. *Am J Surg, 183*(6), 659-662.

Hojat, M., Louis, D. Z., Markham, F. W., Wender, R., Rabinowitz, C., & Gonnella, J. S. (2011). Physicians' empathy and clinical outcomes for diabetic patients. *Acad Med, 86*(3), 359-364. doi:10.1097/ACM.0b013e3182086fe1

Hojat, M., Vergare, M. J., Maxwell, K., Brainard, G., Herrine, S. K., Isenberg, G. A., . . . Gonnella, J. S. (2009). The devil is in the third year: a longitudinal study of erosion of empathy in medical school. *Acad Med, 84*(9), 1182-1191. doi:10.1097/ACM.0b013e3181b17e55

Kangovi, S., Mitra, N., Turr, L., Huo, H., Grande, D., & Long, J. A. (2017). A randomized controlled trial of a community health worker intervention in a population of patients with multiple chronic diseases: Study design and protocol. *Contemp Clin Trials, 53*, 115-121. doi:10.1016/j.cct.2016.12.009

Kaprielian, V. S., Silberberg, M., McDonald, M. A., Koo, D., Hull, S. K., Murphy, G., . . . Michener, J. L. (2013). Teaching population health: a competency map approach to education. *Acad Med, 88*(5), 626-637. doi:10.1097/ACM.0b013e31828acf27

Kellermann, A. L., & Jones, S. S. (2013). What it will take to achieve the as-yet-unfulfilled promises of health information technology. *Health Aff (Millwood), 32*(1), 63-68. doi:10.1377/hlthaff.2012.0693

Kidd, M., Nixon, L., Rosenal, T., Jackson, R., Pereles, L., Mitchell, I., . . . Hughes, L. (2016). Using visual art and collaborative reflection to explore medical attitudes toward vulnerable persons. *Can Med Educ J, 7*(1), e22-30.

Kim, J. Y., Wineinger, N. E., Taitel, M., Radin, J. M., Akinbosoye, O., Jiang, J., . . . Steinhubl, S. (2016). Self-Monitoring Utilization Patterns Among Individuals in an Incentivized Program for Healthy Behaviors. *J Med Internet Res, 18*(11), e292. doi:10.2196/jmir.6371

Kim, K., Choi, J. S., Choi, E., Nieman, C. L., Joo, J. H., Lin, F. R., . . . Han, H. R. (2016). Effects of Community-Based Health Worker Interventions to Improve Chronic Disease Management and Care Among Vulnerable Populations: A Systematic Review. *Am J Public Health, 106*(4), e3-e28. doi:10.2105/AJPH.2015.302987

Kinsella, E. A., & Bidinosti, S. (2016). 'I now have a visual image in my mind and it is something I will never forget': an analysis of an arts-informed approach to health professions ethics education. *Adv Health Sci Educ Theory Pract, 21*(2), 303-322. doi:10.1007/s10459-015-9628-7

Koh, H. K., Gracia, J. N., & Alvarez, M. E. (2014). Culturally and Linguistically Appropriate Services--advancing health with CLAS. *N Engl J Med, 371*(3), 198-201. doi:10.1056/NEJMp1404321

Kohn, J. B. (2016). Stories to Tell: Conducting a Nutrition Assessment with the Use of Narrative Medicine. *Journal of the Academy of Nutrition and Dietetics, 116*(1), 10-14. doi:10.1016/j.jand.2015.06.373

Koniak-Griffin, D., Brecht, M. L., Takayanagi, S., Villegas, J., Melendrez, M., & Balcazar, H. (2015). A community health worker-led lifestyle behavior intervention for Latina (Hispanic) women: feasibility and outcomes of a randomized controlled trial. *Int J Nurs Stud, 52*(1), 75-87. doi:10.1016/j.ijnurstu.2014.09.005

Larson, E. B., & Yao, X. (2005). Clinical empathy as emotional labor in the patient-physician relationship. *JAMA, 293*(9), 1100-1106. doi:10.1001/jama.293.9.1100

Lee, J. M., Hirschfeld, E., & Wedding, J. (2016). A patient-designed do-it-yourself mobile technology system for diabetes: Promise and challenges for a new era in medicine. *JAMA, 315*(14), 1447-1448. doi:10.1001/jama.2016.1903

Lepping, P., Palmstierna, T., & Raveesh, B. N. (2016). Paternalism v. autonomy - are we barking up the wrong tree? *Br J Psychiatry, 209*(2), 95-96. doi:10.1192/bjp.bp.116.181032

Levinson, W., Lesser, C. S., & Epstein, R. M. (2010). Developing physician communication skills for patient-centered care. *Health Aff (Millwood), 29*(7), 1310-1318. doi:10.1377/hlthaff.2009.0450

Levinson, W., & Roter, D. (1995). Physicians' psychosocial beliefs correlate with their patient communication skills. *J Gen Intern Med, 10*(7), 375-379.

Liang, J. J., Goodsell, K. I. M., Grogan, M., & Ackerman, M. J. (2016). LMNA-Mediated Arrhythmogenic Right Ventricular Cardiomyopathy and Charcot-Marie-Tooth Type 2B1: A Patient-Discovered Unifying Diagnosis. *Journal of Cardiovascular Electrophysiology, 27*(7), 868-871. doi:10.1111/jce.12984

Martinez, J., Ro, M., Villa, N. W., Powell, W., & Knickman, J. R. (2011). Transforming the delivery of care in the post-health reform era: what role will community health workers play? *Am J Public Health, 101*(12), e1-5. doi:10.2105/AJPH.2011.300335

Masri, A., & Senussi, M. H. (2017). Trump's Executive Order on Immigration - Detrimental Effects on Medical Training and Health Care. *N Engl J Med*. doi:10.1056/NEJMp1701251

Mazzotti, G., Falconi, M., Teti, G., Zago, M., Lanari, M., & Manzoli, F. A. (2010). The diagnosis of the cause of the death of Venerina. *J Anat, 216*(2), 271-274. doi:10.1111/j.1469-7580.2009.01151.x

Medicaid and Children's Health Insurance Programs: Essential Health Benefits in Alternative Benefit Plans, Eligibility Notices, Fair Hearing and Appeal Processes, and Premiums and Cost Sharing; Exchanges: Eligibility and Enrollment; Final Rule (135). (2013). Federal Register: Centers for Medicare & Medicaid Services Retrieved from https://www.gpo.gov/fdsys/pkg/FR-2013-07-15/pdf/2013-16271.pdf.

Mercer, S. W., & Reynolds, W. J. (2002). Empathy and quality of care. *Br J Gen Pract, 52 Suppl*, S9-12.

Metzl, J. M., & Hansen, H. (2014). Structural competency: theorizing a new medical engagement with stigma and inequality. *Soc Sci Med, 103*, 126-133. doi:10.1016/j.socscimed.2013.06.032

Miller, E., Balmer, D., Hermann, N., Graham, G., & Charon, R. (2014). Sounding narrative medicine: studying students' professional identity development at Columbia University College of Physicians and Surgeons. *Acad Med, 89*(2), 335-342. doi:10.1097/ACM.0000000000000098

Modave, F., Bian, J., Leavitt, T., Bromwell, J., Harris Iii, C., & Vincent, H. (2015). Low Quality of Free Coaching Apps With Respect to the American College of Sports Medicine Guidelines: A Review of Current Mobile Apps. *JMIR Mhealth Uhealth, 3*(3), e77. doi:10.2196/mhealth.4669

Murphy, E. C. S., Carson, L., Neal, W., Baylis, C., Donley, D., & Yeater, R. (2009). Effects of an exercise intervention using Dance Dance Revolution on endothelial function and other risk factors in overweight children. *International Journal of Pediatric Obesity, 4*(4), 205-214. doi:10.3109/17477160902846187

Natbony, L. R., Zimmer, A., Ivanco, L. S., Studenski, S. A., & Jain, S. (2013). Perceptions of a Videogame-Based Dance Exercise Program Among Individuals with Parkinson's Disease. *Games Health J, 2*(4), 235-239. doi:10.1089/g4h.2013.0011

Neumann, M., Bensing, J., Mercer, S., Ernstmann, N., Ommen, O., & Pfaff, H. (2009). Analyzing the "nature" and "specific effectiveness" of clinical empathy: a theoretical overview and contribution towards a theory-based research agenda. *Patient Educ Couns, 74*(3), 339-346. doi:10.1016/j.pec.2008.11.013

Neumann, M., Edelhauser, F., Tauschel, D., Fischer, M. R., Wirtz, M., Woopen, C., . . . Scheffer, C. (2011). Empathy decline and its reasons: a systematic review of studies with medical students and residents. *Acad Med, 86*(8), 996-1009. doi:10.1097/ACM.0b013e318221e615

Obedin-Maliver, J., Goldsmith, E. S., Stewart, L., White, W., Tran, E., Brenman, S., . . . Lunn, M. R. (2011). Lesbian, gay, bisexual, and transgender-related content in undergraduate medical education. *JAMA, 306*(9), 971-977. doi:10.1001/jama.2011.1255

Olson, L. a. M., Michael. (2016). A cancer patient and pathologist — brought together by Twitter — strike up an unlikely connection*2017*. Retrieved from STAT website: https://www.statnews.com/2016/10/17/lung-cancer-patient-pathologist/

Omer, T. (2016). Empowered citizen 'health hackers' who are not waiting. *BMC Medicine, 14*(1), 118. doi:10.1186/s12916-016-0670-y

Patient Protection and Affordable Care Act, Pub. L. No. 111–148 119 (2010).

Perez-Escamilla, R., Damio, G., Chhabra, J., Fernandez, M. L., Segura-Perez, S., Vega-Lopez, S., . . . D'Agostino, D. (2015). Impact of a community health workers-led structured program on blood glucose control among latinos with type 2 diabetes: the DIALBEST trial. *Diabetes Care, 38*(2), 197-205. doi:10.2337/dc14-0327

Perkin, J. E., & Rodriguez, J. C. (2013). More Lit Can Fit: Using Nontraditional Literature in Dietetics Education to Enhance Cultural Competence, Cultural Literacy, and Critical Thinking. *Journal of the Academy of Nutrition and Dietetics, 113*(6), 757. doi:10.1016/j.jand.2013.01.028

Riess, H., Kelley, J. M., Bailey, R., Konowitz, P. M., & Gray, S. T. (2011). Improving empathy and relational skills in otolaryngology residents: a pilot study. *Otolaryngol Head Neck Surg, 144*(1), 120-122. doi:10.1177/0194599810390897

Riess, H., Kelley, J. M., Bailey, R. W., Dunn, E. J., & Phillips, M. (2012). Empathy training for resident physicians: a randomized controlled trial of a neuroscience-informed curriculum. *J Gen Intern Med, 27*(10), 1280-1286. doi:10.1007/s11606-012-2063-z

RMPHEC Grantees. (2017). Retrieved from https://www.aamc.org/initiatives/diversity/portfolios/cdc/aamcbased/rmphec/64936/rmphec_grantees.html

Roman, L. A., Zambrana, R. E., Ford, S., Meghea, C., & Williams, K. P. (2016). Casting a Wider Net: Engaging Community Health Worker Clients and Their Families in Cancer Prevention. *Prev Chronic Dis, 13*, E130. doi:10.5888/pcd13.160114

Rosenthal, E. L., Brownstein, J. N., Rush, C. H., Hirsch, G. R., Willaert, A. M., Scott, J. R., . . . Fox, D. J. (2010). Community health workers: part of the solution. *Health Aff (Millwood), 29*(7), 1338-1342. doi:10.1377/hlthaff.2010.0081

Rothschild, S. K., Martin, M. A., Swider, S. M., Tumialan Lynas, C. M., Janssen, I., Avery, E. F., & Powell, L. H. (2014). Mexican American trial of community health workers: a randomized controlled trial of a community health worker intervention for Mexican

Americans with type 2 diabetes mellitus. *Am J Public Health, 104*(8), 1540-1548. doi:10.2105/AJPH.2013.301439

S(t)imulation—a play created by McGill medical students— encourages empathy and an open dialogue about sex, people and the power of ideas. (2016). Retrieved from http://publications.mcgill.ca/medenews/2016/02/23/stimulation-a-play-created-by-mcgill-medical-students-encourages-empathy-and-an-open-dialogue-about-sex-people-and-the-power-of-ideas/

Scutchfield, F. D. (2004). A third public health revolution: an editorial. *Am J Prev Med, 27*(1), 83-84. doi:10.1016/j.amepre.2004.03.003

Sinsky, C., Colligan, L., Li, L., Prgomet, M., Reynolds, S., Goeders, L., . . . Blike, G. (2016). Allocation of Physician Time in Ambulatory Practice: A Time and Motion Study in 4 Specialties. *Ann Intern Med, 165*(11), 753-760. doi:10.7326/M16-0961

Smith, S. E., Mullen, T. E., Graham, D., Sims, K. B., & Rehm, H. L. (2012). Norrie disease: Extraocular clinical manifestations in 56 patients. *American Journal of Medical Genetics Part A, 158A*(8), 1909-1917. doi:10.1002/ajmg.a.35469

Snowden, L. R. (2003). Bias in mental health assessment and intervention: theory and evidence. *Am J Public Health, 93*(2), 239-243.

Steinhubl, S. R., Mehta, R. R., Ebner, G. S., Ballesteros, M. M., Waalen, J., Steinberg, G., . . . Topol, E. J. (2016). Rationale and design of a home-based trial using wearable sensors to detect asymptomatic atrial fibrillation in a targeted population: The mHealth Screening To Prevent Strokes (mSToPS) trial. *Am Heart J, 175*, 77-85. doi:10.1016/j.ahj.2016.02.011

Stepien, K. A., & Baernstein, A. (2006). Educating for empathy. A review. *J Gen Intern Med, 21*(5), 524-530. doi:10.1111/j.1525-1497.2006.00443.x

Trevorrow, P. (2012). Technology running the world : The Nike+iPod kit and levels of physical activity. *Loisir et Société / Society and Leisure, 35*(1), 131-154. doi:10.1080/07053436.2012.10707838

Wildevuur, S. E., & Simonse, L. W. (2015). Information and communication technology-enabled person-centered care for the "big five" chronic conditions: scoping review. *J Med Internet Res, 17*(3), e77. doi:10.2196/jmir.3687

Wilkes, M., Milgrom, E., & Hoffman, J. R. (2002). Towards more empathic medical students: a medical student hospitalization experience. *Med Educ, 36*(6), 528-533.

Yach, D., Hawkes, C., Gould, C. L., & Hofman, K. J. (2004). The global burden of chronic diseases: overcoming impediments to prevention and control. *JAMA, 291*(21), 2616-2622. doi:10.1001/jama.291.21.2616

Yang, K., Woomer, G. R., Agbemenu, K., & Williams, L. (2014). Relate better and judge less: poverty simulation promoting culturally competent care in community health nursing. *Nurse Educ Pract, 14*(6), 680-685. doi:10.1016/j.nepr.2014.09.001

AUTHOR BIOGRAPHY

Bronwyn was born in Houston, Texas at a hospital across from the Museum of Natural Science and near the Museum of Fine Art in 1994. These two influences permeated throughout her life, influencing her to study both Plan II Honors and Biochemistry Honors at UT Austin in 2013. There, Bronwyn had a fantastic four years leading the Undergraduate Research Journal and Plan II Pre-Medical Society. When not in school, she conducted and published nanomedicine research, worked in health policy at the Texas Capitol, and danced Argentine Tango. Next year she will be attending medical school at the Stanford University School of Medicine where she plans to continue studying broadly and finding ways to integrate her interests in medicine, technology, and population health.